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COMPUTER PROGRAMS FOR 1967 'SLAVE UNIT' MODIFICATIONS

George W. Thomson

Ethyl Corporation
Ferndale, Michigan

August 1967

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COMPUTER PROGRAMS FOR 1967 "SLAVE UNIT" MODIFICATIONS

by

George W. Thomson

Prepared for the

U.S. Public Health Service

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by

ETHYL CORPORATION

Ferndale, Michigan 48220

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TABLE OF CONTENTS

Computer Programs for 1967 "SLAVE" Unit Modifications

	Page
Summary	1
Foreword	1
Contract	2
Paper Tape Punching Format	2
Program TTC66 - Tape-To-Card Converter	2
Idle Condition	3
Power Modes	4
Speed Classes	4
Categorizing Rules	5
Subcategorizing and Tallying Program	8
Flow Plans	10
Zero-Torque Curve	10
Format for Lead Card	10
Tally Tables	11
Summary Page	11
Subcategory Table	11
Special Diagnostic Output	11
Averaging Program	12

SUMMARY

Three computer programs are described for processing SLAVE unit punched paper tapes which are punched with engine speed, manifold vacuum, gear number, and open or closed throttle information every second.

Program TTC66 checks the validity of the characters punched on the tape and transfers the information to a deck of punched cards.

Program MODES analyzes the second-by-second data into 769 subcategories of vehicle operation and summarizes the results in various ways. The criteria and categorizing rules are discussed in detail.

Program MODAVE averages data from the preceding program for any selected group of runs.

Programs MODES and MODAVE are written in a basic type of FORTRAN - IV and have been successfully run on the UNIVAC 1107 at Notre Dame University using a teleprocessing link. Program TTC66 is written in IBM 1620 SPS assembly language and can only be run on that computer.

FOREWORD

This work is a continuation and extension of the truck and bus survey contract work carried out in 1963 to 1965 for the Public Health Service which is detailed in our Reports GR 63-24 and GR 66-33. The special electronic instruments known as SLAVE units were considerably modified so that more detailed information could be punched on paper tapes every second. These data are interpreted by a new computer program in terms of four broad operational categories: idle, cruise, acceleration, and deceleration. These in turn are subdivided into 769 subcategories depending on the initial and final speed, and the initial and final power mode corresponding to the interval for the incidence of the particular category.

About a dozen separate computer programs were used in this investigation. The programs were all initially written for and debugged on the Ethyl IBM 1620 digital computer. The final program for the subcategorization is very large and was eventually reprogrammed for the UNIVAC 1107 computer at Notre

Dame University, South Bend, Indiana, which is connected to our Detroit location by a teleprocessing link. Summarized output data for each run are stored on a magnetic tape and later used to obtain averages for the various weight classes of vehicles.

This report describes the format of the punched paper tape data, the program for conversion to punched card information (TTC66), and the programs for subcategorizing and tallying the data (MODES) and averaging the results (MODAVE). The overall plan of the contract and other types of data processing involved are not covered.

CONTRACT

This work was carried out by Ethyl Corporation in partial fulfillment of Contract PH 86-66-150 for the Public Health Service.

PAPER TAPE PUNCHING FORMAT

In the earlier work the electronic SLAVE unit connected to the engine punched out on paper tape a single digit giving a limited amount of manifold vacuum information and two digits corresponding to the engine speed in rpm divided by 40. The new type of punching gives a total of four characters, which can be represented by the symbols VGTU, followed by the "end-of-line" punch. The TU punches represent the tens and units of the coded engine speed as before. The manifold vacuum transducer has 27 segments corresponding in inches to 0.00 to 1.49, 1.50 to 2.49, etc. by one-inch intervals, with the 27th segment corresponding to 26.5 and up. These 27 values are coded to give the V punch using the IBM 1620 characters J to R, /, S to Z, and 1 to 9. The remaining G punch carries two pieces of information. The gear in use is represented by a punch with 9 if neutral, or 1 to 8 corresponding to the gear. If the throttle is closed, the digit is "flagged".

PROGRAM TTC66 - TAPE-TO-CARD CONVERTER

For convenience in handling and use on more than one kind of computer, the paper tape data are converted to punched card data by means of the IBM 1620 SPS - assembly language program TTC66 (Tape-to-Card, 1966 Tape Punch Codes). At the same time the data are edited and checked for valid

characters.

A lead card is required for each run. The last card of the output is placed at the front of the deck; it includes run information present on the lead card. The remainder of the cards have 12 data points per card in Col. 1 - 72, a code in Col. 76 and a card serial number in Col. 77 - 80. The six columns per data point PGVVTU contain the converted data from the tape. TU is the coded engine speed as on the tape, i.e. RPM/40. G is the gear number with zero for neutral. VV is the rounded manifold vacuum in inches Hg. For example a vacuum of 16.124 in. is punched as 16 and a vacuum of 18.621 in. is punched as 19. The first digit P, the power code, is punched as 4 if the throttle is closed and as zero if the throttle is open. As an example of the six-digit card code, the sequence 432113 means closed throttle, third gear, 21 in. vacuum, 520 rpm engine speed. The last data point is followed by a zero data ender.

The program will run even if the lead card is blank. The information on the corresponding output card needed to implement the subcategorizing program is discussed in detail in that connection. TTC66 outputs on this card the total number of points punched on the tape, good and bad, in Col. 29-33, and the number of good points (which are punched on the cards) in Col. 37-41. Also, 2 is punched in Col. 76.

The program listing is shown as an Appendix. Program TTC66 can only be run on the IBM 1620 computer. Similar programs could be written for other computers capable of accepting paper tapes punched in IBM 1620 formats. Alternatively, a separate tape-card conversion unit could be used, although we have not yet investigated the availability of these units.

IDLE CONDITION

Engine operation is defined to be in the IDLE category if the throttle is closed and the manifold vacuum is within the range IVAC $\pm$ 3 and the engine speed is less than or equal to IDRPM + 40, where IVAC is the manifold vacuum in inches and IDRPM is the engine speed, both determined under

idle conditions before the tests are run. Any value of the current manifold vacuum greater than 13 in. when the throttle is closed is considered to be equal to the idle vacuum, IVAC, in order to guard against mispunchings.

POWER MODES

An important new feature of this work is a new concept for representing power modes rather than the criteria for full and part power based on manifold vacuum used previously. A curve relating vacuum and engine speed is obtained for each vehicle under essentially zero-torque conditions. The manifold vacuum pressure when the carburetor power jet opens is also obtained. The four Power Modes are defined as follows.

Power Mode 1. Full Power.

Open throttle. Manifold vacuum equal to or less than power jet vacuum.

Power Mode 2. Part Power.

Open (or, rarely closed) throttle. Manifold vacuum between power jet vacuum and zero-torque curve.

Power Mode 3. Driven Power.

Open throttle. Manifold vacuum equal to or greater than zero-torque curve.

Power Mode 4. Closed Throttle.

Closed throttle. Manifold vacuum equal to or greater than zero-torque curve.

SPEED CLASSES

The engine speeds are divided into the same six classes as used in the previous work.

Code	Engine Speed, rpm	Class Mark	Midspeed, rpm
00 - 14	0 - 560	1	300
15 - 29	600 - 1160	2	900
30 - 44	1200 - 1760	3	1500
45 - 59	1800 - 2360	4	2100
60 - 74	2400 - 2960	5	2700
75 - 99	3000 - 3960	6	3500

Also as before, these correspond to six speed classes for the Cruise category (here arbitrarily based on the last speed in the interval) and 21 speed classes for the Acceleration or Deceleration category. With four initial and four final power modes possible, the total number of subcategories is 769.

Category	Number
IDL	1 = 1
CRU	16 x 6 = 96
AC	16 x 21 = 336
DE	16 x 21 = 336
	769

CATEGORIZING RULES

Visual inspection of a plot of engine speed against time for any vehicle shows a series of reasonably well defined operational categories of idling, cruising, accelerating, and decelerating. The eye discounts little irregularities and it is quite easy to mark the "change points" when we go from one major category to another. A valid criticism of previous work is that the breakdown into 9 or 15 operational categories fragmented the data unduly with too many extra-short sections. Here only the four main categories are used. The new set of categorizing rules gives results which are virtually identical with those obtained by eye for light, medium or heavy vehicles, passenger cars or trucks.

The research involved in changing the categorizing rules is described in an Ethyl Corporation memorandum (G. W. Thomson to C. Walcutt, Sept. 21, 1966). In a typical example the new rules reduced the number of incidences (i.e. segments or pieces of data) by 57 per cent. Of this improvement about 76 per cent can be attributed to the reduction from 15 to 4 main categories and the remaining 24 per cent to improvements in the "chaining" rules. The rules described below are the basis for the latest version of the subcategorizing program (MODES).

The new categorizing rules are not easy to describe in words. The following notation and definitions have been retained from the older work:

MSPD	coded engine speed at the current second
LSPD	coded engine speed at one second before the current second
KSPD	coded engine speed at two seconds before the current second
JSPD	coded engine speed at three seconds before the current second
MCAT	the current category
LCAT	the current category at the time when the last category was entered; this is the reference for the comparison with MCAT.
LLCAT	the last value of LCAT used
KDUR	the number of seconds the vehicle has been in LCAT
KDURL	the number of seconds the vehicle has been in LLCAT

The current category MCAT is determined from rules which are very similar to those in Table VII-3 of GR 63-24 except that new rules are used for the special recycle. The IDLE category is determined from the definitions given above. Table I shows the criteria for the non-idle categories. As long as MCAT is the same as LCAT, JSPD is made equal to KSPD, KSPD to LSPD, and LSPD to MSPD and we return for another point. This is the normal recycle. However, when MCAT is different from LCAT, a new set of rules takes over. For simplicity we designate a creeping acceleration as -AC and a creeping deceleration as -DE. (It will be recalled that creeping categories are categories which may be part of cruise categories rather than acceleration or deceleration categories.) "Chaining" means tying a group of similar categories together. To "correct" means to delete the incidence and duration just stored in some subcategory and to increase the current duration counter (KDUR) by the duration just stored (KDURL). The various alternatives are identified by a quantity M, and are used in the order given below.

TABLE I

Determination of Current Category, MCAT

Criteria [a]			
MSPD - LSPD	LCAT	MSPD - JSPD	MCAT
≤ -3	-	-	Dec.
$\geq +3$	-	-	Acc.
-2	Dec.	-	Dec.
-2	Cr. Dec.	-	Cr. Dec.
+2	Acc.	-	Acc.
+2	Cr. Acc.	-	Cr. Acc.
-2, -1, 0, +1	Acc.	-	Cr. Acc.
-1, 0, +1, +2	Dec.	-	Cr. Dec.
-2, -1, 0, +1, +2	Idle	-	Cru.
-1, 0, +1, +2	Cr. Dec.	≤ -2	Cr. Dec.
-1, 0, +1, +2	Cr. Dec.	≥ -1	Cru.
-2, -1, 0, +1	Cr. Acc.	$\geq +2$	Cr. Acc.
-2, -1, 0, +1	Cr. Acc.	$\leq +1$	Cru.
-2, -1, 0, +1, +2	Cru.	-1, 0, +1	Cru.
-2, -1, 0, +1, +2	Cru.	≤ -2	Cr. Dec.
-2, -1, 0, +1, +2	Cru.	$\geq +2$	Cr. Acc.

a. The criteria are used in this order: the first two columns together, then the third.

If LLCAT and LCAT were both accelerations or both decelerations we chain by correcting and using LCAT (the normal condition) to determine the subcategory. Here M = 2. In brief

LLCAT	LCAT	Store Using
± DE	± DE	LCAT as is
± AC	± AC	LCAT as is

In practice a long string of creeping and non-creeping accelerations (or decelerations) may be chained in this way and is only recorded as a single long acceleration (or deceleration).

If LCAT is AC or DE no chaining is needed. M = 0.

If LCAT is IDL or CRU or -AC or -DE and the duration in that category (KDUR) is 3 or more seconds no chaining is needed. M = 0.

If the duration is only 1 or 2 seconds, several kinds of chaining are needed.

If ± LLCAT = ± MCAT, the data are chained by storing and changing the name of LCAT to LLCAT. M = 1.

For the following combinations, the data are stored normally without chaining. M = 3.

LLCAT	LCAT	MCAT
AC	IDL or CRU	DE
DE	IDL or CRU	AC

For all other combinations, recycling is used without storing; this is equivalent to changing the name of LCAT to MCAT. M = 5.

A manuscript list showing the application of these rules to the 216 possible combinations of LLCAT, LCAT and MCAT is available. Some of these combinations are, of course, highly unlikely, or physically impossible, such as

AC IDL AC

but the rules give reasonable actions even for these accidentally ridiculous combinations.

Of the 216 combinations, 36 correspond to the normal recycle when MCAT is still equal to LCAT, 40 to storing without chaining, and 50 to normal chaining. If KDUR, the duration in LCAT, is 3 sec. or more, the remaining 90 correspond to normal storing without chaining. If KDUR is only 1 or 2 sec., 30 correspond to chaining into LLCAT, 4 more to normal storing, and 56 to recycling without storing, i.e. chaining into MCAT.

The general philosophy is that little pieces of cruise-like categories, that is, cruise, idle, creeping acceleration, and creeping deceleration, should be absorbed into the adjacent categories. Second-by-second comparison of the computer categories and actual plots for automobiles and trucks confirms that in general the objective has been obtained. The system proposed produces the broad categories of operation without sacrificing any needed detail.

A large amount of computer "housekeeping" is needed to keep track of not only the seconds duration in each segment of data (which may or may not be chained) but also the initial and final values of the manifold vacuum, the engine speed, the power mode, and the nine gear possibilities. Careful hand checking has shown that this was successfully accomplished.

SUBCATEGORIZING AND TALLYING PROGRAM

The purpose of the computer program termed MODES is to (1) process the edited data from the SLAVE tapes using the card output of Program TTC66 as input, (2) provide certain tally tables relating engine speed, manifold vacuum, and power modes, (3) summarize the results for the 769 subcategories, (4) store these results on magnetic tape for future use, and (5) provide a detailed optional diagnostic output for use in investigation of unusual cases of subcategorization.

The program is divided into three parts: MODES (with same title as the whole program), TALOUT, and SUB66. In general these subprograms have the following functions which are further expanded below. In MODES the zero-torque data are entered and a cubic equation is fitted to them. A lead card provides both needed run data and codes for alternative options.

The data are read from the cards, the Power Mode is established, and the data are stored on a high-speed drum with the appropriate Power Modes. As they are processed they are tallied. In TALOUT the tally tables are printed out, as well as a table showing calculated values for the zero-torque curve. In SUB66 the data are retrieved from the drum storage and categorized and subcategorized according to the rules, output tables are printed and the output data are stored on a magnetic tape. The program listings are extensively annotated, but SUB66 is not easy to follow because of the heavy housekeeping burden and the complex chaining system.

These programs are written in FORTRAN-IV for the UNIVAC 1107 at Notre Dame University, South Bend, Indiana. Five input-output units are used designated by the following FORTRAN names:

IIN	Standard card input from teleprocessor
IOUT	Standard printer output on teleprocessor
IREF	Drum buffer
IDIA	Scratch magnetic tape for diagnostic output
IAVE	Storage magnetic tape for output data (used as input for MODAVE, the averaging program)

The source programs are stored on a separate magnetic tape and can be modified or updated very easily by line numbers. The current versions have 1450 lines of statements and comments. Two related Notre Dame system subroutines are used. The FORTRAN statement

END FILE JJJ

puts a software end-of-file mark on tape unit JJJ. (This is the same as ASA FORTRAN IV, Sec. 7.1.3.3.3.) The subroutine call

CALL EOF ($1234)

transfers to Statement 1234 (for example) when a software end-of-file mark is encountered on the tape being read. Note that this call is used on Lines 96 and 241 of MODES to avoid a false exit on the use of the programs to process more than a single run. DATA statements are used extensively for preloading both numerical data (Lines 59 to 73 of MODES) and Hollerith or alphameric data (Lines 18, 19 of TALOUT and Lines 39 to 57 of SUB66).

A number of special topics are considered in greater detail.

Flow Plans

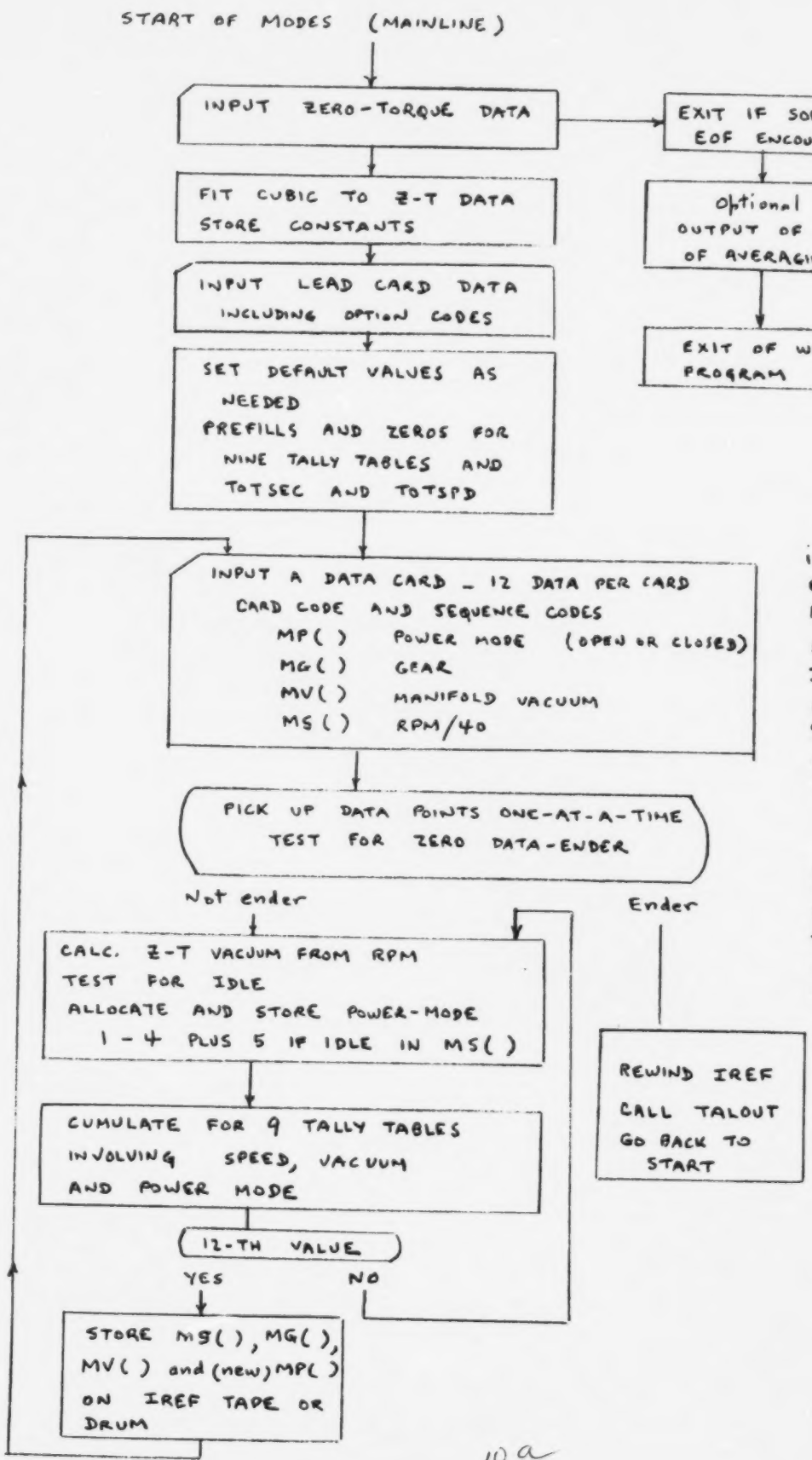
The overall flow plan of this program is shown on two sheets. The general functions only are indicated.

Zero-Torque Curve

The zero-torque curve relates manifold vacuum to engine speed under zero torque conditions. The experimental data are plotted and eight smoothed values are read from the curve at 800 (400) 3600 rpm. These are used as input to computer program MODES. A least squares cubic equation is obtained using a "cubic fitting matrix" for the point spacing. (The matrix was obtained using a special service program and the proprietary Ethyl Corporation double-precision simultaneous equation solving program for the IBM 1620.) A table of calculated values for the whole speed range shows the goodness of fit.

Format for Lead Card

The run information card, or lead card, follows the zero-torque data card. Table II describes the format. The data in Col. 13 to 56 are in I-format, so that they should have no decimal point and be right-justified in the columns shown. All of this information (except Col. 29 to 41) can be punched in the lead card for TTC66, the tape-to-card converter. The codes for optional output alternatives in Col. 58 to 64 are mainly for diagnostic and debugging purposes.


START OF MODES (MAINLINE)
INPUT ZERO-TORQUE DATA
EXIT IF SOFTWARE EOF ENCOUNTERED
FIT CUBIC TO Z-T DATA STORE CONSTANTS
Optional OUTPUT OF CONTENTS OF AVERAGING TAPE
INPUT LEAD CARD DATA INCLUDING OPTION CODES
EXIT OF WHOLE PROGRAM
SET DEFAULT VALUES AS NEEDED
PREFILLS AND ZEROS FOR NINE TALLY TABLES AND TOTSEC AND TOTSPD
INPUT A DATA CARD - 12 DATA PER CARD
CARD CODE AND SEQUENCE CODES
MP( ) POWER MODE (OPEN OR CLOSED)
MG( ) GEAR
MV( ) MANIFOLD VACUUM
MS( ) RPM/40
PICK UP DATA POINTS ONE-AT-A-TIME
TEST FOR ZERO DATA-ENDER
Not ender
Ender
CALC. Z-T VACUUM FROM RPM
TEST FOR IDLE
ALLOCATE AND STORE POWER-MODE
1 - 4 PLUS 5 IF IDLE IN MS( )
REWIND IREF
CALL TALOUT
GO BACK TO START
CUMULATE FOR 9 TALLY TABLES
INVOLVING SPEED, VACUUM
AND POWER MODE
12-TH VALUE
YES
NO
STORE MS( ), MG( ), MV( ) and (new) MP( ) ON IREF TAPE OR DRUM

NOTE

This part of MODES inputs all needed data, evaluates the Power Mode for each point, stores data on the IREF tape or drum, cumulates for the 9 tally tables, and goes to TALOUT, the next part.

It also provides a proper exit for the whole program and the optional output of the contents of the averaging tape.

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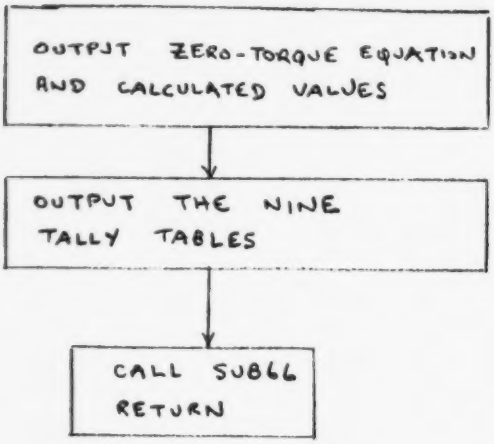
AUG. 24, 67

SUBROUTINE TALOUT OF MODES



SUBROUTINE SUB66 OF MODES

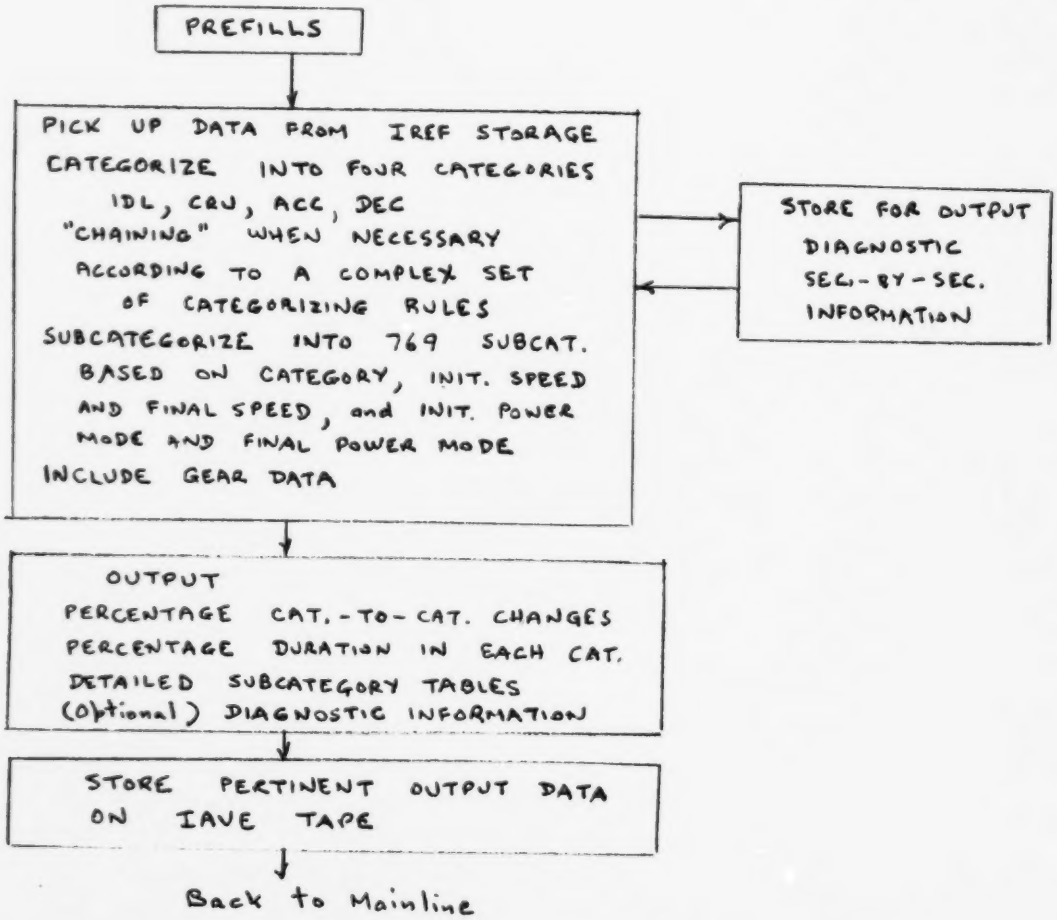

PREFILLS
PICK UP DATA FROM IREF STORAGE
CATEGORIZE INTO FOUR CATEGORIES IDL, CRU, ACC, DEC
"CHAINING" WHEN NECESSARY ACCORDING TO A COMPLEX SET OF CATEGORIZING RULES
SUBCATEGORIZE INTO 769 SUBCAT. BASED ON CATEGORY, INIT. SPEED AND FINAL SPEED, and INIT. POWER MODE AND FINAL POWER MODE
INCLUDE GEAR DATA
STORE FOR OUTPUT DIAGNOSTIC SEC.-BY-SEC. INFORMATION
OUTPUT
PERCENTAGE CAT.-TO-CAT. CHANGES
PERCENTAGE DURATION IN EACH CAT.
DETAILED SUBCATEGORY TABLES
(Optional) DIAGNOSTIC INFORMATION
STORE PERTINENT OUTPUT DATA ON IAVE TAPE
Back to Mainline

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TABLE II

Run Information Lead Card

Columns	Information
1	Blank
2 - 10	Up to 9 Digit Alphameric run number
13 - 16	Idle rpm
18 - 20	IDSPD = Idle rpm/40
22	Number of Gears
24 - 25	Idle Vacuum, in. Hg.
29 - 33	Indata -- Total punched, good and bad
37 - 41	IGOOD -- Good points
49 - 50	SLAVE Unit No.
55 - 56	Power Jet Vacuum, In. Hg.

Normal output with Col. 58 - 64 All Blank*
Output zero torque data and tally tables
Averaging Data stored on Tape IAVE
Contents of IAVE listed at end
No Diagnostic Listings

58	KD(1) Second-by-Second Listing
60	KD(3) Blow-By-Blow Subcategorizing Listing
61	KD(4) Do not output zero torque data and the Tally Tables
62	KD(5) Diagnostic Before SUB66 Tables
63	KD(6) Do not store data on Averaging Tape
64	KD(7) Do not output Contents of Averaging Tape
67 - 73	Seven-Digit Run Code
67	K7(1) Truck No. in Group
68	K7(2) Kind of Test
69	K7(3) Weight Class
70	K7(4) Make
71	K7(5) Flow Element No.
72	K7(6) City Road Operation Simulated
73	K7(7) Vehicle Load
76	Card Code - Must be 2 for First Card
77 - 80	Card Number

*Otherwise, use any digit in these columns.

Tally Tables

The incidence, duration on a time basis and duration on a revolutions basis are tallied in three ways. The four power modes are shown against manifold vacuum in inches. Two other sets give speed vs vacuum. The more detailed tables subdivide the speed into 120 rpm groups: 0 to 80, 120 to 200, 240 to 320, etc. and the vacuum into inches. The broader tables show 9 groupings of speed and vacuum. The speeds are 0 to 680, 720 to 1040, etc. in 360 rpm groups, with the ninth grouping 3240 to 3960 rpm. The vacuum intervals are 1 to 5, 6 to 9, 10 to 12, 13 and 14, 15 and 16, 17 and 18, 19 and 20, 21 and 22, and 24 and up.

Summary Page

The summary page includes information on the vehicle and the type of run. The major operational category cumulations on a time basis and on a revolutions basis are given with the percentage of the category-to-category changes.

Subcategory Table

The incidence, duration, initial, final and average speed and vacuum are given for each of the 769 subcategories of operation with non-zero incidence. In addition the table gives the average duration time in the subcategory and the percentages on both a time basis and a revolutions basis. A separate section of the table shows the percentage of the subcategory time in the gear number shown. (These add to 100 per cent for each subcategory.)

Special Diagnostic Output

An optional diagnostic output is also available by punching any digit in Col. 58 and 60 of the lead card. This shows every quantity involved in the second-by-second analysis of the data leading to the main categories. Even the most complex type of chaining can be followed in detail. The gear data are not included. This additional output was originally used for debugging but it has been found useful for a complete understanding of the application of the categorizing rules to actual experimental data.

AVERAGING PROGRAM

The data for several runs are averaged using the UNIVAC 1107 program known as MODAVE, which is written in FORTRAN-IV. The data to be averaged were stored on the tape designated IAVE using Program MODES.

The output is similar to that of MODES. A summary sheet lists the runs to be included in the average and the runs actually averaged (to protect against data retrieval errors) with the number of gears. The averages of the idle speed, idle vacuum, power jet vacuum, average speed in rpm, and the zero torque curve are shown.

Averages, standard deviations and two-sided 95 per cent confidence limits are given for power mode percentages on an incidence, duration and revolutions basis. Similar tables are shown for percentage category-to-category changes and for the major category percentages on a duration and revolutions basis.

The main table shows for each of the non-empty subcategories its identification, and averages of initial, average and final speed; initial, average and final vacuum; average duration time; and percentage revolutions. Also shown are averages, standard deviations and confidence limits for the percentage duration with a two-asterisk mark if the averages are significantly different from zero at the 95 per cent level. In other words, when the lower confidence limit is greater than zero. In this way, the important subcategories can be quickly located.

The table with the averaged gear data is of a similar nature except that the gears are renumbered with the highest set equal to 8.

SYMBOL TABLE

TESTSW	04094	PARITY	04723	INDATA	05296	DATEND	04576	BAD	03674
BLKIN	05313	CARD	04953	CLEAN	05115	COUNT	05278	DATIN	04300
ENDER	04226	EXIT	04372	FIRST	04264	G	04784	GBHD	04118
GBOUT	04034	GOOD	03782	IDRPM	04781	INP	02702	KARD	04791
KB	04770	KG	04776	LAST	03830	LPMK	05284	MFSP	05281
MGB	04745	M1	04613	M2	04687	NEWCD	04540	NGEND	04190
OUT	04432	Q1	02414	Q2	02462	S1	02402	S2	02606
TOT	05290	V	04787	VGOOD	03650	ZERO	04251		

```
*
*
*          CONVERTOR FOR 1966 PHS SLAVE TAPES TO CARDS
*           G. W. THOMSON, ETHYL CORP., DETROIT, MICH.
*
*          OCT. 12, 1966  8 AM
*              DISC NAME.....TTC66
*
*             VACUUM CODED FOR CONVERSION TO IN. HG
*             INCLUDES GEARS AND CLOSED THROTTLE
*                 OCT. 1966 DEFINITIONS
*
*           SW. 1 ON TO SKIP DATA PROCESSING
*           SW. 2 ON TO TYPE GOOD AND BAD
*           SW. 3 ON TO HALT AFTER EACH GOOD BAD PRINT
*           SW. 4 ON TO EITHER TYPE BAD PARITY
*              OR TYPE ALPHAMERIC AND NUMERIC REPRESENTATION
*              OF BAD POINT THEN HALT...HIT START AND
*              NORMAL PROCESSING IS RESTORED
*          NORMAL PROCESSING SW. 1, 2, 3, 4 ALL OFF
*
*
*
*
*
          DORG  2402                                        02402
 S1       SF    Q1+2                                        02402 32 02416 00000
 Q1       RCTY                                              02414 34 00000 00102
*
*            TYPE MESSAGE IF SW. 1 IS ON
*
          BNC1 Q2                                           02426 47 02462 00100
          WATY M1                                           02438 39 04613 00100
          RCTY                                              02450 34 00000 00102
*
*            INPUT CARD WITH COL.  2-10 RUN NUMBER
*                        AND COL. 13-16 IDLE RPM
*                        AND COL. 50    SLAVE UNIT NO.
*
 Q2       TR    KARD-1,CLEAN-1,.   FOR INPUT AND OUTPUT     02462 31 04790 05114
          RACD  KARD                                        02474 37 04791 00500
          SF    KARD+23                                     02486 32 04814 00000
          SF    KARD+24                                     02498 32 04815 00000
          TNS   KARD+30,IDRPM                               02510 72 04821 04781
          LD    99,IDRPM                                    02522 28 00099 04781
          DM    98,40,10                                    02534 19 00098 000M0
```

```
                TNF   KARD+38,97                                  02546 73 04829 00097
*
                TD    M2+32,KARD+98                               02558 25 04719 04889
                WATY  M2                                          02570 39 04687 00100
                RCTY                                              02582 34 00000 00102
                TDM   M2+32,0                                     02594 15 04719 00000
*
 S2             TDM   MFSP,0                                      02606 15 05281 00000
                TFM   TOT,0,7                                     02618 16 05290 -0000
                TFM   INDATA,0,7                                  02630 16 05296 -0000
                TFM    COUNT,1,8                                  02642 16 05278 0-001
                TDM   LPMK,1                                      02654 15 05284 00001
                CF    Q1+3                                        02666 33 02417 00000
                TFM    KG,0,7                                     02678 16 04776 -0000
                TFM    KB,0,7                                     02690 16 04770 -0000
*
*
*          INPUT OF ALL DATA POINTS FROM PAPER TAPE
*            WITH CHECKS FOR PARITY AND CHARACTER VALIDITY
*
*
 INP            TR    5996, BLKIN - 15                            02702 31 05996 05298
                BI    *+12,00700,,WRITE CHECK                     02714 46 02726 00700
                RAPT  6001                                        02726 37 06001 00300
                AM    INDATA,1,10                                 02738 11 05296 000-1
                BNI   *+144,01900,,ANY DATA CHECK                 02750 47 02894 01900
                BI    *+12,00600,,READ CHECK                      02762 46 02774 00600
                BI    *+12,01600,,MBR-E PARITY CHECK              02774 46 02786 01600
                BI    *+12,01700,,MBR-O PARITY CHECK              02786 46 02798 01700
                TR    5996, BLKIN - 15                            02798 31 05996 05298
                BI    *-12,01600                                  02810 46 02798 01600
                BI    *-24,01700                                  02822 46 02798 01700
                BNC4  BAD + 84                                    02834 47 03758 00400
                WATY  PARITY                                      02846 39 04723 00100
                RCTY                                              02858 34 00000 00102
                H                                                 02870 48 00000 00000
                B     BAD + 84                                    02882 49 03758 00000
                BNR   BAD,6009                                    02894 45 03674 06009
                BNR   *+24,6007                                   02906 45 02930 06007
                B     BAD                                         02918 49 03674 00000
                CM    6007, 79,10                                 02930 14 06007 000P9
                BH    BAD                                         02942 46 03674 01100
                CM    6007, 70,10                                 02954 14 06007 000P0
                BL    BAD                                         02966 47 03674 01300
                BNR   *+24,6005                                   02978 45 03002 06005
                B     BAD                                         02990 49 03674 00000
                CM    6005, 79,10                                 03002 14 06005 000P9
                BH    BAD                                         03014 46 03674 01100
                CM    6005, 70,10                                 03026 14 06005 000P0
                BL    BAD                                         03038 47 03674 01300
                BNR   *+24,6003                                   03050 45 03074 06003
                B     BAD                                         03062 49 03674 00000
                CF    6006                                        03074 33 06006 00000
                CM    6007, 7070,8                                03086 14 06007 0P070
                BNE   * + 48                                      03098 47 03146 01200
                CM    6001, 70,10                                 03110 14 06001 000P0
                BE    LAST ,,,LAST POINT ENDER                    03122 46 03830 01200
                B     BAD,,,V NOT ZERO BUT TU = 00                03134 49 03674 00000
                BNR   *+24,6003                                   03146 45 03170 06003
                B     BAD                                         03158 49 03674 00000
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          TF   G,6003,,STORE CODED GEAR                          03170 26 04784 06003
          CM   G,79,10                                           03182 14 04784 000P9
          BH   BAD                                               03194 46 03674 01100
          CM   G,70,10                                           03206 14 04784 000P0
          BH   *+96                                              03218 46 03314 01100
          CM   G,50,10                                           03230 14 04784 000N0
          BL   BAD                                               03242 47 03674 01300
          CM   G,59,10                                           03254 14 04784 000N9
          BH   BAD                                               03266 46 03674 01100
          AM   G,20,10                                           03278 11 04784 000K0
          TFM  5997,74,10,  POWER = 4                            03290 16 05997 000P4
          B    *+24                                              03302 49 03326 00000
          TFM  5997,70,10,  POWER = 0                            03314 16 05997 000P0
          CM   G,79,10                                           03326 14 04784 000P9
          BNE  *+24                                              03338 47 03362 01200
          TFM  G,70,10,  FOR NEUTRAL GEAR                        03350 16 04784 000P0
          TF   5999,G,, STORE G FOR OUTPUT                       03362 26 05999 04784
          TF   V,6001,,STORE ALPHAMERICALLY CODED VACUUM         03374 26 04787 06001
          CM   V,21,10                                           03386 14 04787 000K1
          BL   BAD                                               03398 47 03674 01300
          BH   * + 36                                            03410 46 03446 01100
          TFM  V,10,10,CHANGE 21 CODE TO IN. HG                  03422 16 04787 000J0
          B    VGOOD                                             03434 49 03650 00000
          CM   V,51,10                                           03446 14 04787 000N1
          BL   BAD                                               03458 47 03674 01300
          CM   V,59,10                                           03470 14 04787 000N9
          BH   * + 36                                            03482 46 03518 01100
          SM   V,50,,CHANGE CHANGE 51 TO 59 CODE TO IN. HG
                                                                 03494 12 04787 -0050
          B    VGOOD                                             03506 49 03650 00000
          CM   V,62,10                                           03518 14 04787 00002
          BL   BAD                                               03530 47 03674 01300
          CM   V,69,10                                           03542 14 04787 00009
          BH   * + 36                                            03554 46 03590 01100
          SM   V,51,10,CHANGE 62 TO 69 CODES TO IN. HG           03566 12 04787 000N1
          B    VGOOD                                             03578 49 03650 00000
          CM   V,71,10                                           03590 14 04787 000P1
          BL   BAD                                               03602 47 03674 01300
          CM   V,79,10                                           03614 14 04787 000P9
          BH   BAD                                               03626 46 03674 01100
          SM   V,52,10,CHANGE 71 TO 79 CODES TO IN. HG           03638 12 04787 000N2
VGOOD     TNF  6003,V,,PUT IN IN. HG                             03650 73 06003 04787
          B    GOOD                                              03662 49 03782 00000
*
*            GOOD AND BAD POINT ANALYSIS SECTION
*              FOR RESCUE WORK
*
BAD       BNC4 * + 84                                            03674 47 03758 00400
          WATY 6001                                              03686 39 06001 00100
          SPTY                                                   03698 34 00000 00101
          SPTY                                                   03710 34 00000 00101
          WNTY 6000                                              03722 38 06000 00100
          RCTY                                                   03734 34 00000 00102
          H                                                      03746 48 00000 00000
          AM   KB,1,10                                           03758 11 04770 000-1
          B    INP                                               03770 49 02702 00000
*
GOOD      CM    KB,0,10                                          03782 14 04770 000-0
          BNE  LAST + 36                                         03794 47 03866 01200
          AM    KG,1,10                                          03806 11 04776 000-1
```

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          B      GBOUT                                          03818 49 04034 00000
*
 LAST     TFM    5999,7070,8                                    03830 16 05999 0P070
          TFM    6003,70,10                                     03842 16 06003 000P0
          TDM    LPMK,0                                         03854 15 05284 00000
*
          BNC2   *+120,,,SKIP PRINT OF GOOD AND BAD             03866 47 03986 00200
          BNF    GBHD,Q1+3,,PRINT HEADING FIRST TIME            03878 44 04118 02417
          CF      KG-4                                          03890 33 04772 00000
          WNTY    KG-4                                          03902 38 04772 00100
          SPTY                                                  03914 34 00000 00101
          CF      KB-4                                          03926 33 04766 00000
          WNTY    KB-4                                          03938 38 04766 00100
          RCTY                                                  03950 34 00000 00102
          BNC3   *+24                                           03962 47 03986 00300
          H                                                     03974 48 00000 00000
          TFM     KB,0,7                                        03986 16 04770 -0000
          CM     LPMK,0,10                                      03998 14 05284 000-0
          BE      TESTSW                                        04010 46 04094 01200
          TFM     KG,1,7                                        04022 16 04776 -0001
 GBOUT    BC1     INP,,,DO NOT STORE POINTS ON CARD             04034 46 02702 00100
          CM      MFSP,0,10                                     04046 14 05281 000-0
          BE      FIRST                                         04058 46 04264 01200
          AM      TOT,1,10, COUNT GOOD POINTS, EXCL. FIRST + ENDER
          B       DATIN,,,  TO TRANSFER TO CARDS                04070 11 05290 000-1
*                                                               04082 49 04300 00000
 TESTSW BC1     OUT,,,  TO PUNCH OF LAST CARD                  04094 46 04432 00100
          B       DATIN                                         04106 49 04300 00000
*
 GBHD     RCTY                                                  04118 34 00000 00102
          WATY MGB                                              04130 39 04745 00100
          RCTY                                                  04142 34 00000 00102
          RCTY                                                  04154 34 00000 00102
          SF     Q1+3                                           04166 32 02417 00000
          B       LAST + 36                                     04178 49 03866 00000
*
*           SPECIAL RESTART IF 000 ENDER
*              OCCURS AS A FALSE DATA POINT
*
 NGEND    TDM    LPMK,1                                         04190 15 05284 00001
          SM      COUNT,1,10,   DECREMENT CARD COUNT            04202 12 05278 000-1
          B      INP                                            04214 49 02702 00000
*
*           SPECIAL RESTART IN PLACE OF 000 ENDER
*
 ENDER    TR      5996,ZERO - 1                                 04226 31 05996 04250
          B       LAST + 24                                     04238 49 03854 00000
 ZERO     DAC     7,0000000                                     04251 00014
*
*
*          LOAD UP TO 12 DATA POINTS INTO OUTPUT AREA
*
*
*               FIRST GOOD POINT ONLY
*
 FIRST    TDM     MFSP,1                                        04264 15 05281 00001
          TFM     DATIN+6,CARD-1                                04276 16 04306 -4952
          TR      CARD-1,CLEAN,,   BLANKS CARD IMAGE            04288 31 04952 05115
*
```

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*              ALL POINTS...FIRST,OTHERS,LAST,ENDER
*
 DATIN  30     99999,5996,,        TR NO RECORD MARK          04300 30 99999 05996
        CM     LPMK,0,10,          TEST FOR 000 ENDER         04312 14 05284 000-0
        BE     DATEND                                         04324 46 04576 01200
        AM     DATIN+6,12,10                                  04336 11 04306 000J2
        CM     DATIN+6,CARD+143,,TEST FOR 12TH POINT STORED
                                                              04348 14 04306 -5096
        BL     INP,,,               FOR NEW POINT             04360 47 02702 01300
*
 EXIT   TNF    CARD+158,COUNT,,  CARD COUNT                   04372 73 05111 05278
        AM     COUNT,1,10,  INCREMENT CARD COUNT              04384 11 05278 000-1
        WACD   CARD                                           04396 39 04953 00400
        CM     LPMK,0,10                                      04408 14 05284 000-0
        BNE    NEWCD                                          04420 47 04540 01200
*
*          000 ENDER HAS BEEN TRANSFERRED TO LAST DATA CARD
*          LOAD INDATA AND TOT...CLEANUP OUTPUT CARD...2 TO COL. 76
*
 OUT    TDM    CARD+149,0,,CLEAN OUT THE ONE IN               04432 15 05102 00000
        TDM    CARD+150,0,,   COLUMN 76                       04444 15 05103 00000
*
        TNF    KARD+64,INDATA                                 04456 73 04855 05296
        TNF    KARD+80,TOT                                    04468 73 04871 05290
        TNF    KARD+158,COUNT                                 04480 73 04949 05278
        TFM    KARD+150,72,10                                 04492 16 04941 000P2
        WACD   KARD                                           04504 39 04791 00400
        H                                                     04516 48 00000 00000
        B      S1                                             04528 49 02402 00000
*
 NEWCD  TFM    DATIN+6,CARD-1                                 04540 16 04306 -4952
        TR     CARD-1,CLEAN,,      BLANKS CARD IMAGE OUTPUT AREA
                                                              04552 31 04952 05115
        B      INP                                            04564 49 02702 00000
*
*          CODE THE CARD WITH 000 WITH 1 IN COL. 76
*
 DATEND TDM    CARD+149,7                                     04576 15 05102 00007
        TDM    CARD+150,1                                     04588 15 05103 00001
        B      EXIT                                           04600 49 04372 00000
*
*
*
*
*
 M1     DAC   37,SWITCH 1 IS  ON TO SKIP DATA STORAGE@       04613 00074
 M2     DAC   18, SLAVE UNIT NO. 0@                          04687 00036
 PARITY DAC   11,BAD PARITY@                                 04723 00022
 MGB    DAC   11, GOOD  BAD@                                 04745 00022
*
 KB     DC     5,0                                           04770 00005
        DC     1,@                                           04771 00001
 KG     DC     5,0                                           04776 00005
        DC     1,@                                           04777 00001
 IDRPM  DC     4,0                                           04781 00004
        DC     1,@                                           04782 00001
 G      DC    2,0                                            04784 00002
        DC    1,@                                            04785 00001
 V      DC    2,0                                            04787 00002
        DC    1,@                                            04788 00001
```

```
KARD    DAS    80
        DAC    1,Q
CARD    DAS    80
        DAC    1,Q
CLEAN   DC     2,0
        DSC    38,0
        DSC    40,0
        DSC    40,0
        DSC    40,0
        DC     1,Q
COUNT   DC     4,0
        DC     1,Q
MFSP    DC     2,0
        DC     1,Q
LPMK    DC     2,0
        DC     1,Q
TOT     DC     5,0
        DC     1,Q
INDATA  DC     5,0
        DC     1,Q
        DC     2,0
        DC     2,0
        DC     2,0
        DC     2,0
        DC     2,0
        DC     2,0
        DC     2,0
BLKIN   DC     2,0Q
        DEND   S1
```

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04791 00160
04951 00002
04953 00160
05113 00002
05115 00002
05116 00038
05154 00040
05194 00040
05234 00040
05274 00001
05278 00004
05279 00001
05281 00002
05282 00001
05284 00002
05285 00001
05290 00005
05291 00001
05296 00005
05297 00001
05299 00002
05301 00002
05303 00002
05305 00002
05307 00002
05309 00002
05311 00002
05313 00002
02402
```

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0002 I 000053 LJ891      0002 I 000045 LPMK       0000 I 000124 MAT        0000 I 000060 MG         0000 I 000044 MP
0000 I 000134 MPIN       0000 I 000022 MPJVAC     0002 I 000062 MPOW       0000 I 000110 MS         0002 I 000063 MSPD
0000 I 000074 MV         0002 I 000061 MVAC       0000 I 000033 MV9        0000   007200 NCHG       0000   023230 NGCUM
0000 I 000030 NOAVE      0000 I 000011 NRUNS      0000   007220 NSEC       0000 I 000021 NSLAVE     0002   000210 NTEMPS
0000   007177 NTOTCH     0000 I 000007 NUMGR      0002 R 000064 S          0000 R 001312 SP108      0000 R 000516 SP81
0000 R 005306 SP891      0000   007176 TOTRPM     0000 R 000201 TOTSEC     0000 R 000202 TOTSPD     0000 R 000150 VZT
0002 R 000067 X          0002 R 000040 ZREF       0000 R 000160 ZTA        0000 R 000161 ZTB        0000 R 000162 ZTC
0000 R 000163 ZTD
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00100     1*   C
00100     2*   C     GWT SOURCE TAPE AT NOTRE DAME IS NO. 251
00100     3*   C
00100     4*   C     UNIVAC 1107 FORTRAN-IV  NOTRE DAME UNIVERSITY
00100     5*   C
00100     6*   C     THE STATEMENT.....END FILE JJJ
00100     7*   C     PUTS A SOFTWARE-END-OF-FILE-MARK ON TAPE JJJ
00100     8*   C
00100     9*   C     N-D SUBROUTINE CALL.....CALL EOF ($1234)
00100    10*   C     JUMPS TO ST. 1234 WHEN ANY SOFTWARE-TAPE-EOF-MARK IS FOUND
00100    11*   C     NOTE USE OF DOLLAR SIGN HERE
00100    12*   C
00100    13*   C
00100    14*   C     THIS VERSION IS DATED MAY 23, 1967  8 AM
00100    15*   C     CALL FOR N-D SUBROUTINE  PTOEOF REMOVED IN THIS VERSION
00100    16*   C
00100    17*   C
00100    18*   C     POWER MODES ANALYZER AND SUBCATEGORIZER
00100    19*   C
00100    20*   C     GEORGE W. THOMSON,  ETHYL,  DETROIT
00100    21*   C     BASED ON IBM 1620 PROGRAM
00100    22*   C           MODES...NOV. 22, 1966   8 AM
00100    23*   C
00100    24*   C     THREE PROGRAMS
00100    25*   C          WITH DRUM STORAGE OF REFURBISHED DATA DECK WITH POWER MODES
00100    26*   C     MAIN PROGRAM
00100    27*   C           POWER MODE ANALYZER.....MODES
00100    28*   C     TWO SUBROUTINES
00100    29*   C           TALLY TABLE OUTPUT.......TALOUT
00100    30*   C           SUBCATEGORIZER...........SUB66
00100    31*   C
00100    32*   C
00100    33*   C     INPUT...RAW DATA DECK.....POWER = 0 TO 9
00100    34*   C     OUTPUT..IDENTICAL EXCEPT  POWER = 1,2,3,4 OR 5 IF IDLE
00100    35*   C
00100    36*   C     INPUT POWER = 0,1,2,3,6,7,8,9  HANDLED AS IF 0...NOT C.T.
00100    37*   C     INPUT POWER = 4,5              HANDLED AS IF 4...C.T.
00100    38*   C
00100    39*   C
00100    40*   C
00101    41*         COMMON IIN,IOUT,IREF,IDTA,IDIP,IDRUM,IAVE,NUMGR,KSEVEN,NRUNS
00103    42*         COMMON KA,KB,IDLRPM,IDSPD,IVAC,INDATA,IGOOD,NSLAVE,MPJVAC,KD(8)
00104    43*         COMMON    MV9(9),MP(12),MG(12),MV(12),MS(12),MAT,K7(7)
00105    44*         COMMON MPIN(12)
00106    45*         COMMON VZT(8),ZTA,ZTB,ZTC,ZTD,KODEZT
00107    46*         COMMON D(12)
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00110    47*          COMMON TOTSEC,TOTSPD,INC81,INC108,INC891
00111    48*          COMMON     IN81(10,10),DU81(10,10),SP81(10,10)
00112    49*          COMMON     IN108(5,28),DU108(5,28),SP108(5,28)
00113    50*          COMMON     IN891(34,28),DU891(34,28),SP891(34,28)
00114    51*          COMMON TOTRPM,NTOTCH,NCHG(16)
00115    52*          COMMON     NSEC(769),INCID(769),CISPD(769),CLSPD(769),
00115    53*         1   CIVAC(769),CLVAC(769),CASPD(769),CAVAC(769),NGCUM(769,9)
00116    54*          DIMENSION CUBA(8),CUBB(8),CUBC(8),CUBD(8)
00117    55*          DIMENSION ZREF(4)
00120    56*          EQUIVALENCE (KD(1),KSCSC),(KD(3),KBLOW),(KD(5),KDIAGN)
00121    57*          EQUIVALENCE (KD(6),NOAVE)
00121    58*    C
00122    59*          DATA (MV9(I),I=1,9)/5,9,12,14,16,18,20,23,35/
00124    60*          DATA (CUBA(I),I=1,8)/-1.2121212E-01, 1.8181818E-01, 3.1168831E-01,
00124    61*         1            3.1385281E-01, 2.3376623E-01, 1.1688312E-01,
00124    62*         2            8.6580087E-03,-4.5454545E-02/
00126    63*          DATA (CUBB(I),I=1,8)/ 2.5252525E-02,-1.7279942E-01,-1.6810967E-01,
00126    64*         1           -4.6536797E-02, 1.0606061E-01, 2.0382395E-01,
00126    65*         2            1.6089466E-01,-1.0858586E-01/
00130    66*          DATA (CUBC(I),I=1,8)/ 6.8181818E-02,-1.2987013E-02,-4.4372294E-02,
00130    67*         1           -4.1125541E-02,-1.8398268E-02, 8.6580086E-03,
00130    68*         2            2.4891775E-02, 1.5151515E-02/
00132    69*          DATA (CUBD(I),I=1,8)/-1.7676768E-02, 1.2626263E-02, 1.7676768E-02,
00132    70*         1            7.5757576E-03,-7.5757576E-03,-1.7676768E-02,
00132    71*         2           -1.2626263E-02, 1.7676768E-02/
00134    72*          DATA (ZREF(I),I=1,4)/ 2.0517533E+01,-2.0930740E-01,-1.1893945E-01,
00134    73*         1            9.8484900E-03/
00134    74*    C
00134    75*    C
00134    76*    C     SET LOGICAL UNIT NUMBERS FOR SYSTEM
00134    77*    C
00134    78*    C                 IIN     CARD INPUT
00136    79*          IIN = 5
00136    80*    C                 IOUT    STANDARD OUTPUT
00137    81*          IOUT = 6
00137    82*    C                 IREF    DRUM BUFFER FOR REFURBISHED-DATA-DECK
00140    83*          IREF = 26
00140    84*    C                 IDIA    SCRATCH-TAPE FOR SEC.-BY-SEC. AND BLOW-BY-BLOW
00141    85*          IDIA = 8
00141    86*    C
00142    87*          IAVE = 10
00142    88*    C                 IAVE    TAPE FOR DATA TO BE AVERAGED
00142    89*    C
00143    90*      300 NRUNS = 0
00144    91*          REWIND IAVE
00144    92*    C                          CALL PTOEOF (IAVE)   REMOVED FROM HERE
00145    93*        1 LPMK = 0
00145    94*    C
00146    95*          REWIND IREF
00147    96*        2 CALL EOF ($400)
00147    97*    C
00147    98*    C     INPUT ZERO TORQUE CARD
00147    99*    C        MAN. VAC. AT 800,1200,1600,2000,2400,2800,3200,3600 RPM
00147   100*    C             NONE MUST BE MISSING
00147   101*    C                   USUAL COMPLETE DATA CARD HAS 8 IN COL. 76
00147   102*    C     IF NO DATA ARE KNOWN...USE CARD WITH ONLY 7 IN COL. 76
00147   103*    C
00150   104*      100 READ (IIN,9100) (VZT(I), I=1,8),KODEZT,KARD
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00160   105*     9100 FORMAT (8F7.2,19X,I1,I4)
00161   106*      102 IF (KODEZT - 8) 103,104,3
00164   107*      103 IF (KODEZT - 6) 3,3,5
00164   108*    C
00167   109*        3 WRITE (IOUT,903)
00171   110*      903 FORMAT (29H BAD CODE ON ZT CARD...RESEND/)
00172   111*          CALL EXIT
00172   112*    C
00172   113*    C     FIT LEAST SQUARES CUBIC TO VZT( )
00172   114*    C
00173   115*      104 ZTA = 0.0
00174   116*          ZTB = 0.0
00175   117*          ZTC = 0.0
00176   118*          ZTD = 0.0
00177   119*          DO 106 I=1,8
00202   120*          ZTA = ZTA + CUBA(I)*VZT(I)
00203   121*          ZTB = ZTB + CUBB(I)*VZT(I)
00204   122*          ZTC = ZTC + CUBC(I)*VZT(I)
00205   123*      106 ZTD = ZTD + CUBD(I)*VZT(I)
00205   124*    C
00205   125*    C     FIRST CARD DATA
00205   126*    C     DUPLICATE OF FIRST CARD FOR THE ACTUAL RUN
00205   127*    C
00205   128*    C          1          BLANK
00205   129*    C          2 - 10     UP TO 9 DIGIT ALPHAMERIC RUN NUMBER
00205   130*    C         13 - 16     IDLE RPM
00205   131*    C         18 - 20     IDSPD = IDLE RPM/40
00205   132*    C         22          NUMBER OF GEARS
00205   133*    C         24 - 25     IDLE VACUUM, IN. HG
00205   134*    C         29 - 33     INDATA...TOTAL PUNCHED, GOOD AND BAD
00205   135*    C         37 - 41     IGOOD....GOOD POINTS
00205   136*    C         49 - 50     SLAVE UNIT NO.
00205   137*    C         55 - 56     POWER JET VACUUM, IN. HG
00205   138*    C
00205   139*    C     NORMAL OUTPUT WITH COL. 58 - 64 ALL BLANK
00205   140*    C        OUTPUT ZERO TORQUE DATA AND TALLY TABLES
00205   141*    C        AVERAGING DATA STORED ON TAPE IAVE
00205   142*    C        CONTENTS OF IAVE LISTED AT END
00205   143*    C        NO DIAGNOSTIC LISTINGS
00205   144*    C
00205   145*    C         58          KD(1)   SECOND-BY-SECOND LISTING
00205   146*    C         60          KD(3)   BLOW-BY-BLOW SUBCATEGORIZING LISTING
00205   147*    C         61          KD(4)   DO NOT OUTPUT ZERO TORQUE DATA
00205   148*    C                                 AND THE TALLY TABLES
00205   149*    C         62          KD(5)   DIAGNOSTIC BEFORE SUB66 TABLES
00205   150*    C         63          KD(6)   DO NOT STORE DATA ON AVERAGING TAPE
00205   151*    C         64          KD(7)   DO NOT OUTPUT CONTENTS OF AVERAGING TAPE
00205   152*    C
00205   153*    C         67 - 73     SEVEN-DIGIT RUN CODE
00205   154*    C
00205   155*    C         67          K7(1)   TRUCK NO. IN GROUP
00205   156*    C         68          K7(2)   KIND OF TEST
00205   157*    C         69          K7(3)   WEIGHT CLASS
00205   158*    C         70          K7(4)   MAKE
00205   159*    C         71          K7(5)   FLOW ELEMENT NO.
00205   160*    C         72          K7(6)   CITY ROAD OPERATION SIMULATED
00205   161*    C         73          K7(7)   VEHICLE LOAD
00205   162*    C
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00205   163*   C         76        CARD CODE..MUST BE 2 FOR FIRST CARD
00205   164*   C         77 - 80   CARD NUMBER
00205   165*   C
00205   166*   C
00207   167*        5 READ (IIN,9080)KA,KB,IDLRPM,IDSPD,NUMGR,IVAC,INDATA,IGOOD,NSLAVE,
00207   168*         1                    MPJVAC,(KD(I), I=1,8),(K7(I), I=1,7),KODE,KARD
00235   169*    9080 FORMAT (1X,A4,A5,I6,2X,I2,I2,I3,3X,I5,3X,I5,7X,I2,4X,
00235   170*         1       I2,  I2,7I1,  1X,7I1,  2X,I1,  I4)
00235   171*   C
00236   172*          IF (KODE - 2) 4,131,4
00241   173*      131 MAT = 769
00242   174*          KSEVEN = 1000000*K7(1)+100000*K7(2)+10000*K7(3)+1000*K7(4)
00242   175*         1            +100*K7(5)+10*K7(6)+K7(7)
00243   176*      133 IF (IVAC) 134,134,135
00246   177*      134 IVAC = 18
00247   178*      135 IF (MPJVAC) 136,136,8134
00252   179*      136 MPJVAC = 6
00253   180*     8134 IF (NUMGR) 8135,8135,138
00256   181*     8135 IF (K7(3)-3) 8138,8136,8137
00261   182*     8136 NUMGR = 4
00262   183*          GO TO 138
00263   184*     8137 NUMGR = 5
00264   185*          GO TO 138
00265   186*     8138 NUMGR = 3
00266   187*      138 IF (KODEZT - 7) 10,140,10
00266   188*   C
00271   189*      140 ZTA = ZREF(1)
00272   190*          ZTB = ZREF(2)
00273   191*          ZTC = ZREF(3)
00274   192*          ZTD = ZREF(4)
00274   193*   C
00274   194*   C     PREFILLS FOR TALLY TABLES
00274   195*   C
00275   196*       10 LI81 = -1
00276   197*          LJ81 = -1
00277   198*          LI891 = -1
00300   199*          LJ891 = -1
00301   200*          LI108 = -1
00302   201*          LJ108 = -1
00302   202*   C
00303   203*          INC81 = 0
00304   204*          INC891 = 0
00305   205*          INC108 = 0
00306   206*          TOTSEC = 0.0
00307   207*          TOTSPD = 0.0
00307   208*   C
00310   209*          DO 12 I=1,10
00313   210*          DO 12 J=1,10
00316   211*          IN81(I,J) = 0
00317   212*          DU81(I,J) = 0.0
00320   213*       12 SP81(I,J) = 0.0
00320   214*   C
00323   215*          DO 14 I=1,34
00326   216*          DO 14 J=1,28
00331   217*          IN891(I,J) = 0
00332   218*          DU891(I,J) = 0.0
00333   219*       14 SP891(I,J) = 0.0
00333   220*   C
```

22<

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00336  221*          DO 16 I=1,5
00341  222*          DO 16 J=1,28
00344  223*          IN108(I,J) = 0
00345  224*          DU108(I,J) = 0.0
00346  225*       16 SP108(I,J) = 0.0
00346  226*    C
00346  227*    C
00346  228*    C      INPUT DATA CARD
00346  229*    C
00351  230*       20 READ (IIN,920) (MP(I),MG(I),MV(I),MS(I), I=1,12),KODE,KARD
00364  231*      920 FORMAT(12(2I1,2I2),3X,I1,I4)
00365  232*          IF(KODE-1)22,22,4
00365  233*    C
00365  234*    C      OUTPUT CONTENTS OF AVERAGING TAPE
00365  235*    C         SKIP OUTPUT IF COL. 64 IS NOT BLANK
00365  236*    C
00370  237*      400 IF (NOAVE) 311,402,311
00373  238*      402 IF (KD(7)) 311,404,311
00376  239*      404 END FILE IAVE
00377  240*          REWIND IAVE
00400  241*          CALL EOF ($312)
00401  242*      406 READ (IAVE,9400) KK
00404  243*     9400 FORMAT (40H
00404  244*         135H                                          ,I5)
00405  245*          IF (KK - 1) 410,408,410
00410  246*      408 WRITE (IOUT,9408)
00412  247*     9408 FORMAT (1H1)
00413  248*      410 WRITE (IOUT,9400) KK
00416  249*          GO TO 406
00416  250*    C
00416  251*    C      EXIT OF THE WHOLE PROGRAM
00416  252*    C
00417  253*      311 END FILE IAVE
00420  254*      312 REWIND IAVE
00421  255*          CALL EXIT
00421  256*    C
00422  257*        4 WRITE (IOUT,904) KARD
00425  258*      904 FORMAT (5H CARD,I5,19H...CODE BAD..RESEND/)
00426  259*     4444 CALL EXIT
00426  260*    C
00426  261*    C      PICK UP DATA POINTS ONE-AT-A-TIME
00426  262*    C
00427  263*       22 DO 92 IPT = 1,12
00432  264*          MVAC = MV(IPT)
00433  265*          MPOW = MP(IPT)
00434  266*          MPIN(IPT) = MPOW
00435  267*          MSPD = MS(IPT)
00436  268*          S = MSPD
00436  269*    C
00436  270*    C      TEST FOR LAST POINT ENDER
00436  271*    C
00437  272*          IF (MVAC) 24,24,241
00442  273*       24 LPMK = 1
00443  274*          GO TO 841
00444  275*      241 IF (MPOW - 5) 26,242,28
00447  276*       26 IF (MPOW - 3) 28,28,263
00452  277*      242 MPOW = 4
00453  278*          MP(IPT) = 4
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00454  279*      263 IF (MVAC - 12) 264,264,261
00457  280*      264 MVAC = IVAC
00460  281*          MV(IPT) = IVAC
00461  282*       25 IF (MSPD - IDSPD - 2) 27,27,32
00464  283*      261 IF (MVAC - IVAC - 3) 262,25,32
00467  284*      262 IF (MVAC - IVAC + 3) 32,25,25
00472  285*       27 MP(IPT) = 5
00472  286*    C                                POWER CODED 5 IF IDLE
00473  287*      271 I108 = 4
00474  288*          GO TO 41
00475  289*       28 IF (MVAC - MPJVAC) 30,30,32
00500  290*       30 MP(IPT) = 1
00501  291*          GO TO 40
00502  292*       32 BUFF = MSPD - 50
00503  293*          X = 0.1*BUFF
00504  294*          JJ = ZTA + X*(ZTB + X*(ZTC + ZTD*X)) + 0.5
00505  295*           IF (MVAC - JJ) 36,35,35
00510  296*       35 IF(MPOW - 4) 34,40,34
00513  297*       34 MP(IPT) = 3
00514  298*          GO TO 40
00515  299*       36 MP(IPT) = 2
00515  300*    C
00515  301*    C     TALLYING SECTION
00515  302*    C
00516  303*       40 I108 = MP(IPT)
00517  304*       41 J108 = MVAC
00520  305*          I891 = MSPD/3 + 1
00521  306*          J891 = MVAC
00522  307*          IF(MSPD - 17) 42,42,44
00525  308*       42 I81 = 1
00526  309*          GO TO 46
00527  310*       44 I81 = MSPD/9
00530  311*       46 J81 = 1
00531  312*       48 IF(MVAC - MV9(J81)) 52,52,50
00534  313*       50 J81 = J81 + 1
00535  314*          GO TO 48
00535  315*    C
00536  316*       52 TOTSPD = TOTSPD + S
00537  317*          TOTSEC = TOTSEC + 1.0
00537  318*    C
00540  319*          DU81(I81,J81) = DU81(I81,J81) + 1.0
00541  320*          DU108(I108,J108) = DU108(I108,J108) + 1.0
00542  321*          DU891(I891,J891) = DU891(I891,J891) + 1.0
00542  322*    C
00543  323*          SP81(I81,J81) = SP81(I81,J81) + S
00544  324*          SP108(I108,J108) = SP108(I108,J108) + S
00545  325*          SP891(I891,J891) = SP891(I891,J891) + S
00545  326*    C
00546  327*          DU81(I81,10) = DU81(I81,10) + 1.0
00547  328*          DU81(10,J81) = DU81(10,J81) + 1.0
00550  329*          DU108(I108,28) = DU108(I108,28) + 1.0
00551  330*          DU108( 5,J108) = DU108( 5,J108) + 1.0
00552  331*          DU891(I891,28) = DU891(I891,28) + 1.0
00553  332*          DU891(34,J891) = DU891(34,J891) + 1.0
00553  333*    C
00554  334*          SP81(I81,10) = SP81(I81,10) + S
00555  335*          SP81(10,J81) = SP81(10,J81) + S
00556  336*          SP108(I108,28) = SP108(I108,28) + S
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00557   337*          SP108( 5,J108) = SP108( 5,J108) + S
00560   338*          SP891(I891,28) = SP891(I891,28) + S
00561   339*          SP891(34,J891) = SP891(34,J891) + S
00561   340*    C
00562   341*         54 IF(I81 - LI81) 58,56,58
00565   342*         56 IF(J81 - LJ81) 60,64,60
00570   343*         58 LI81 = I81
00571   344*         60 LJ81 = J81
00572   345*         62 INC81 = INC81 + 1
00573   346*            IN81(I81,J81) = IN81(I81,J81) + 1
00574   347*            IN81(I81,10 ) = IN81(I81,10 ) + 1
00575   348*            IN81(10,J81 ) = IN81(10,J81 ) + 1
00575   349*    C
00576   350*         64 IF(I108 - LI108) 68,66,68
00601   351*         66 IF(J108 - LJ108) 70,74,70
00604   352*         68 LI108 = I108
00605   353*         70 LJ108 = J108
00606   354*         72 INC108 = INC108 + 1
00607   355*            IN108(I108,J108) = IN108(I108,J108) + 1
00610   356*            IN108(I108,28)   = IN108(I108,28)   + 1
00611   357*            IN108 (5,J108)   = IN108 (5,J108) + 1
00611   358*    C
00612   359*         74 IF(I891 - LI891) 78,76,78
00615   360*         76 IF(J891 - LJ891) 80,92,80
00620   361*         78 LI891 = I891
00621   362*         80 LJ891 = J891
00622   363*         82 INC891 = INC891 + 1
00623   364*            IN891(I891,J891) = IN891(I891,J891) + 1
00624   365*            IN891 (I891,28) = IN891(I891,28) + 1
00625   366*            IN891(34,J891) = IN891(34,J891) + 1
00625   367*    C
00626   368*        92 CONTINUE
00626   369*    C
00630   370*       841 WRITE (IREF) (MPIN(I),MP(I),MG(I),MV(I),MS(I), I=1,12),KODE,KARD
00630   371*    C
00644   372*            IF (LPMK) 107,20,107
00644   373*    C
00647   374*       107 REWIND IREF
00650   375*           CALL TALOUT
00651   376*           GO TO 1
00652   377*           END

   END OF LISTING.     0 *DIAGNOSTIC* MESSAGE(S).
MODES              SYMBOLIC
MODES   CODE       RELOCATABLE                                  20 JUL 67  09:27:37   0  01041452     14   377  (DELETED)
                                                                20 JUL 67  09:27:37   1  01037352     24     1  (DELETED)
                                                                                      0  01037402     14    76
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12:13:47    @ FOR,* TALOUT,TALOUT
COMPILATION BY UNIVAC 1107 FORTRAN-IV DATED     JUNE 22,1965 F4008
THIS COMPILATION WAS DONE ON 30 AUG 67 AT 12:13:48


   SUBROUTINE TALOUT    ENTRY POINT 001267

   STORAGE USED (BLOCK, NAME, LENGTH)

        0001    *CODE   001277
        0002    *DATA   000444
        0000    *BLANK  040641


   EXTERNAL REFERENCES (BLOCK, NAME)

        0003    SUB66
        0004    NWDU$
        0005    NI01$
        0006    NI02$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

 0001   000115 120L      0001   000140 122L      0001   000151 130L      0001   000037 151G      0001   000224 245G
 0001   000250 257G      0001   000253 262G      0001   000333 315G      0001   000405 344G      0001   000431 356G
 0001   000464 376G      0001   000526 422G      0001   000543 433G      0001   000630 467G      0001   000654 506G
 0001   000714 531G      0001   000733 543G      0001   000774 566G      0001   001046 611G      0001   001134 642G
 0001   001206 665G      0001   000245 702L      0001   000275 708L      0001   000266 7082L     0001   000272 7083L
 0001   000313 710L      0001   000322 712L      0001   000350 720L      0001   000424 722L      0001   000444 724L
 0001   000462 726L      0001   000506 728L      0001   000477 7282L     0001   000503 7283L     0001   000534 730L
 0001   000550 732L      0001   000560 740L      0001   000625 742L      0001   000640 744L      0001   000652 746L
 0001   000676 748L      0001   000667 7482L     0001   000673 7483L     0001   000722 751L      0001   000740 752L
 0001   000750 760L      0001   001011 780L      0001   001063 800L      0001   001110 820L      0001   001151 840L
 0001   001250 844L      0001   001255 846L      0001   001223 860L      0001   000127 9006F     0002   000066 9108F
 0002   000077 9109F     0002   000113 9110F     0002   000123 9120F     0002   000125 9122F     0002   000131 9150F
 0002   000153 9602F     0002   000321 9604F     0002   000326 9608F     0002   000144 9610F     0002   000205 9612F
 0002   000140 9700F     0002   000160 9704F     0002   000170 9706F     0002   000176 9712F     0002   000214 9720F
 0002   000175 9723F     0002   000224 9724F     0002   000233 9729F     0002   000241 9730F     0002   000250 9740F
 0002   000260 9742F     0002   000301 9750F     0002   000312 9751F     0002 R 000056 BUFF      0000   020226 CASPD
 0000   021627 CAVAC     0000   012222 CISPD     0000   015224 CIVAC     0000   013623 CLSPD     0000   016625 CLVAC
 0000 R 000165 D         0002 R 000055 DIFF      0000 R 001076 DU108     0000 R 000352 DU81      0000 R 003416 DU891
 0002 R 000057 FACT      0002 R 000051 FI       *0002 I 000046 I         0000   000006 IAVE      0000   000003 IDIA
 0000   000004 IDIP      0000   000014 IDLRPM     0000   000005 IDRUM     0000   000015 IDSPD     0000   000020 IGOOD
 0002 I 000047 II        0002 I 000060 IIAV      0000   000000 IIN       0002 I 000064 ILINE     0000   010621 INCID
 0000 I 000204 INC108    0000 I 000203 INCA1.    0000 I 000205 INC891    0000   000017 INDATA    0000 I 000662 IN108
 0000 I 000206 IN81      0000 I 001526 IN891     0000 I 000001 IOUT      0000   000002 IREF      0000   000016 IVAC
 0002 I 000054 J         0002 I 000050 JJ        0002 I 000061 JTAB      0002 I 000062 K         0000 I 000012 KA
 0000 I 000013 KB        0000   000025 KBLOW     0000 I 000023 KD        0000   000027 KDIAGN    0000 I 000164 KODEZT
 0002 I 000000 KPA       0002 I 000005 KPB       0000   000023 KSCSC     0000   000010 KSEVEN    0002 I 000063 KTAB
 0000   000125 K7        0002 I 000065 LTAB      0000   000124 MAT       0000   000060 MG        0000   000044 MP
 0000   000134 MPIN      0000 I 000022 MPJVAC    0000   000110 MS        0000   000074 MV        0000   000033 MV9
 0000   007200 NCHG      0000   023230 NGCUM     0000   000030 NOAVE     0000   000011 NRUNS     0000   007220 NSEC
 0000   000021 NSLAVE    0002   000433 NTEMP$    0000   007177 NTOTCH    0000   000007 NUMGR     0002 R 000012 OUT
 0000 R 001312 SP108     0000 R 000516 SP81      0000 R 005306 SP891     0000   007176 TOTRPM    0000 R 000201 TOTSEC
 0000 R 000202 TOTSPD    0000 R 000150 VZT       0002 R 000052 X         0002 R 000053 ZT        0000 R 000160 ZTA
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0000 R 000161 ZTB 0000 R 000162 ZTC 0000 R 000163 ZTD

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00101     1*          SUBROUTINE TALOUT
00103     2*          COMMON IIN,IOUT,IREF,IDIA,IDIP,IDRUM,IAVE,NUMGR,KSEVEN,NRUNS
00104     3*          COMMON KA,KB,IDLRPM,IDSPD,IVAC,INDATA,IGOOD,NSLAVE,MPJVAC,KD(8)
00105     4*          COMMON    MV9(9),MP(12),MG(12),MV(12),MS(12),MAT,K7(7)
00106     5*          COMMON MPIN(12)
00107     6*          COMMON VZT(8),ZTA,ZTB,ZTC,ZTD,KODEZT
00110     7*          COMMON D(12)
00111     8*          COMMON TOTSEC,TOTSPD,INC81,INC108,INC891
00112     9*          COMMON    IN81(10,10),DU81(10,10),SP81(10,10)
00113    10*          COMMON    IN108(5,28),DU108(5,28),SP108(5,28)
00114    11*          COMMON    IN891(34,28),DU891(34,28),SP891(34,28)
00115    12*          COMMON TOTRPM,NTOTCH,NCHG(16)
00116    13*          COMMON    NSEC(769),INCID(769),CISPD(769),CLSPD(769),
00116    14*         1   CIVAC(769),CLVAC(769),CASPD(769),CAVAC(769),NGCUM(769,9)
00117    15*          DIMENSION KPA(5),KPB(5),OUT(28)
00120    16*          EQUIVALENCE (KD(1),KSCSC),(KD(3),KBLOW),(KD(5),KDIAGN)
00121    17*          EQUIVALENCE (KD(6),NOAVE)
00122    18*          DATA (KPA(I),I=1,5)/5HFULL ,5HPART ,5HDRIVE,5HCLOS.,5HTOTAL/
00124    19*          DATA (KPB(I),I=1,5)/4H    ,4H    ,4HN   ,4H TH.,4H    /
00124    20*    C
00124    21*    C     SKIP OUTPUT OF ZERO TORQUE DATA  AND TALLY TABLES
00124    22*    C        IF COL. 61 ON CONTROL CARD IS NOT ZERO
00124    23*    C
00126    24*      100 IF (KD(4)) 846,108,846
00126    25*    C
00126    26*    C     OUTPUT EQUATION AND FITTED VALUES
00126    27*    C
00131    28*      108 WRITE (IOUT,9108)KA,KB
00135    29*     9108 FORMAT(42H1ZERO-TORQUE MANIFOLD VACUUM DATA FOR RUN ,A4,A5/)
00135    30*      109 WRITE (IOUT,9109)ZTA,ZTB,ZTC,ZTD
00144    31*     9109 FORMAT (5X,3HA =,1PE15.7/5X,3HB =,1PE15.7/5X,3HC =,1PE15.7/
00144    32*         1        5X,3HD =,1PE15.7//)
00145    33*      110 WRITE (IOUT,9110)
00147    34*     9110 FORMAT(/36H      RPM     OBS.    CALC.    DIFF./)
00147    35*    C
00150    36*      112 DO 130 I=1,21
00153    37*          II = I - 1
00154    38*          JJ = 200*II
00155    39*          FI = I
00156    40*          X = 0.5*(FI - 11.0)
00157    41*          ZT = ZTA + X*(ZTB + X*(ZTC + ZTD*X))
00160    42*          IF (I - 5) 122,114,114
00163    43*      114 IF(I - 19) 116,116,122
00166    44*      116 IF (II - 2*(II/2)) 122,118,122
00171    45*      118 J = X + 4.0
00172    46*          IF (KODEZT - 7) 120,119,120
00175    47*      119 VZT(J) = ZT
00176    48*      120 DIFF = VZT(J) - ZT
00177    49*          WRITE (IOUT,9120)JJ,VZT(J),ZT,DIFF
00205    50*     9120 FORMAT (I9,3F9.2)
00206    51*          GO TO 130
00207    52*      122 WRITE (IOUT,9122)JJ,ZT
00213    53*     9122 FORMAT (I9,9X,F9.2)
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27<

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00214    54*      130 CONTINUE
00214    55*    C
00216    56*          WRITE (IOUT,9006)
00220    57*     9006 FORMAT (1H /1H )
00221    58*          WRITE (IOUT,9150) MPJVAC
00224    59*     9150 FORMAT (19H POWER JET VACUUM =,I3,7H IN. HG)
00224    60*    C
00224    61*    C     OUTPUT TALLY TABLES
00224    62*    C
00224    63*    C                              INCIDENCE
00224    64*    C                              POWER VS. VACUUM...108 TABLE
00224    65*    C
00225    66*      700 WRITE (IOUT,9700)KA,KB
00231    67*     9700 FORMAT (9H1RUN NO. ,A4,A5/)
00232    68*          WRITE (IOUT,9610)
00234    69*     9610 FORMAT (31H MANIFOLD VACUUM VS. POWER MODE/)
00235    70*          WRITE (IOUT,9602)
00237    71*     9602 FORMAT (/21H PERCENTAGE INCIDENCE/)
00240    72*          WRITE (IOUT,9704)
00242    73*     9704 FORMAT(10H ..POWER..,51X,22HIN. HG MANIFOLD VACUUM)
00243    74*          WRITE (IOUT,9706) (J, J= 1,27)
00251    75*     9706 FORMAT (11X,          17I4,5I5,5I4,8H   TOTAL/)
00252    76*          BUFF = INC108
00253    77*          FACT = 100.0/BUFF
00254    78*          IIAV = 1
00255    79*          JTAB = 1
00255    80*    C
00256    81*      702 DO 712 I = 1,5
00261    82*          DO 708 J = 1,28
00264    83*          IF(JTAB - 2) 7081,7082,7083
00267    84*     7081 BUFF = IN108(I,J)
00270    85*          OUT(J) = BUFF*FACT
00271    86*          GO TO 708
00272    87*     7082 OUT(J) = DU108(I,J)*FACT
00273    88*          GO TO 708
00274    89*     7083 OUT(J) = SP108(I,J)*FACT
00275    90*      708 CONTINUE
00277    91*          IF (I - 5) 711,710,710
00302    92*      711 D(IIAV) = OUT(28)
00303    93*          IIAV = IIAV + 1
00304    94*          GO TO 712
00304    95*    C
00305    96*      710 OUT(28) = 100.0
00306    97*          WRITE (IOUT,9723)
00310    98*     9723 FORMAT (1H )
00311    99*      712 WRITE (IOUT,9712)KPA(I),KPB(I),(OUT(K),  K = 1,28)
00322   100*     9712 FORMAT (1X,A5,A4,2X,17F4.1,5F5.1,5F4.1,F6.1)
00323   101*          IF(JTAB - 2) 760,820,740
00323   102*    C
00323   103*    C                              INCIDENCE
00323   104*    C                              SPEED VS. VACUUM...891 TABLE
00323   105*    C
00326   106*      720 WRITE (IOUT,9700)KA,KB
00332   107*          WRITE (IOUT,9612)
00334   108*     9612 FORMAT (33H MANIFOLD VACUUM VS. ENGINE SPEED/)
00335   109*          WRITE (IOUT,9602)
00337   110*          WRITE (IOUT,9720)
00341   111*     9720 FORMAT(10H ..SPEED..,51X,22HIN. HG MANIFOLD VACUUM)
```

28<

```
00342  112*          WRITE (IOUT,9724) (K, K = 1,27)
00350  113*     9724 FORMAT (11H FROM  TO  ,17I4,5I5,5I4,8H   TOTAL)
00351  114*          BUFF = INC891
00352  115*          FACT = 100.0/BUFF
00353  116*          KTAB = 1
00353  117*    C
00354  118*      722 ILINE = 3
00355  119*          DO 732 I = 1,34
00360  120*          IF (ILINE - 3) 724,723,723
00363  121*      723 WRITE (IOUT,9723)
00365  122*          ILINE = 0
00366  123*      724 ILINE = ILINE + 1
00367  124*          II = 120*I - 120
00370  125*          JJ = II + 80
00371  126*          IF (I - 33) 726,725,726
00374  127*      725 JJ = 3960
00375  128*      726 DO 728 J = 1,28
00400  129*          IF(KTAB - 2) 7281,7282,7283
00403  130*     7281 BUFF = IN891(I,J)
00404  131*          OUT(J) = BUFF*FACT
00405  132*          GO TO 728
00406  133*     7282 OUT(J) = DU891(I,J)*FACT
00407  134*          GO TO 728
00410  135*     7283 OUT(J) = SP891(I,J)*FACT
00411  136*      728 CONTINUE
00413  137*          IF (I - 34) 729,730,730
00416  138*      729 WRITE (IOUT,9729)II,JJ,(OUT(K), K = 1,28)
00426  139*     9729 FORMAT (2I5,2X,17F4.1,5F5.1,5F4.1,F6.1)
00427  140*          GO TO 732
00430  141*      730 OUT(28) = 100.0
00431  142*          WRITE (IOUT,9730) (OUT(K) , K = 1,28)
00437  143*     9730 FORMAT(12H    TOTAL     ,17F4.1,5F5.1,5F4.1,F6.1)
00440  144*      732 CONTINUE
00442  145*          IF (KTAB - 2) 780,840,844
00442  146*    C
00442  147*    C                                  INCIDENCE
00442  148*    C                                  SPEED VS. VACUUM...81 TABLE
00442  149*    C
00445  150*      740 WRITE (IOUT,9700)KA,KB
00451  151*          WRITE (IOUT,9612)
00453  152*          WRITE (IOUT,9602)
00455  153*          WRITE (IOUT,9740)
00457  154*     9740 FORMAT(10H ..SPEED...,29X,22HIN. HG MANIFOLD VACUUM)
00460  155*          WRITE (IOUT,9742)
00462  156*     9742 FORMAT (40H FROM  TO   1,2,3,4,5 6,7,8,9 10,11,12  ,
00462  157*         1        40H13,14  15,16  17,18  19,20 21,22,23 24 U,
00462  158*         2         8HP  TOTAL/)
00463  159*          BUFF = INC81
00464  160*          FACT = 100.0/BUFF
00465  161*          LTAB = 1
00465  162*    C
00466  163*      742 DO 752 I = 1,10
00471  164*          IF (I - 1) 744,743,744
00474  165*      743 II = 0
00475  166*          JJ = 680
00476  167*          GO TO 746
00477  168*      744 II = 360*I
00500  169*          JJ = II + 320
```

```
00501  170*          IF (I - 9) 746,745,746
00504  171*      745 JJ = 3960
00505  172*      746 DO 748 J = 1,10
00510  173*          IF (LTAB - 2) 7481,7482,7483
00513  174*     7481 BUFF = IN81(I,J)
00514  175*          OUT(J) = BUFF*FACT
00515  176*          GO TO 748
00516  177*     7482 OUT(J) = DU81(I,J)*FACT
00517  178*          GO TO 748
00520  179*     7483 OUT(J) = SP81(I,J)*FACT
00521  180*      748 CONTINUE
00523  181*          IF (I - 10) 751,750,750
00526  182*      750 OUT(10) = 100.0
00527  183*          WRITE (IOUT,9750) (OUT(K), K = 1,10)
00535  184*     9750 FORMAT(/8H   TOTAL,F10.1,F9.1,F8.1,F9.1,4F7.1,F8.1,F7.1/)
00536  185*          GO TO 752
00537  186*      751 WRITE (IOUT,9751)II,JJ,(OUT(K), K = 1,10)
00547  187*     9751 FORMAT (2I5,F8.1,F9.1,F8.1,F9.1,4F7.1,F8.1,F7.1)
00550  188*      752 CONTINUE
00552  189*          IF (LTAB - 2) 800,860,720
00552  190*    C
00552  191*    C
00552  192*    C                                DURATION
00552  193*    C                                POWER VS. VACUUM...108 TABLE
00555  194*      760 WRITE (IOUT,9006)
00557  195*          WRITE (IOUT,9604)
00561  196*     9604 FORMAT (/20H PERCENTAGE DURATION/)
00562  197*          WRITE (IOUT,9704)
00564  198*          WRITE (IOUT,9706) (K, K = 1,27)
00572  199*          FACT = 100.0/TOTSEC
00573  200*          JTAB = 2
00574  201*          GO TO 702
00574  202*    C
00574  203*    C
00574  204*    C                                DURATION
00575  205*      780 WRITE (IOUT,9700)KA,KB       SPEED VS. VACUUM...891 TABLE
00601  206*          WRITE (IOUT,9612)
00603  207*          WRITE (IOUT,9604)
00605  208*          WRITE (IOUT,9720)
00607  209*          WRITE (IOUT,9724) (J, J = 1,27)
00615  210*          FACT = 100.0/TOTSEC
00616  211*          KTAB = 2
00617  212*          GO TO 722
00617  213*    C
00617  214*    C
00617  215*    C                                DURATION
00617  216*    C                                SPEED VS. VACUUM...81 TABLE
00620  217*      800 WRITE (IOUT,9604)
00622  218*          WRITE (IOUT,9740)
00624  219*          WRITE (IOUT,9742)
00626  220*          FACT = 100.0/TOTSEC
00627  221*          LTAB = 2
00630  222*          GO TO 742
00630  223*    C
00630  224*    C                                REVOLUTIONS
00630  225*    C                                POWER VS. VACUUM...108 TABLE
00630  226*    C
00631  227*      820 WRITE (IOUT,9006)
```

```
00633   228*          WRITE (IOUT,9608)
00635   229*     9608 FORMAT(/32H PERCENTAGE ON REVOLUTIONS BASIS/)
00636   230*          WRITE (IOUT,9704)
00640   231*          WRITE (IOUT,9706) (K, K = 1,27)
00646   232*          FACT = 100.0/TOTSPD
00647   233*          JTAB = 3
00650   234*          GO TO 702
00650   235*    C
00650   236*    C
00650   237*    C                                REVOLUTIONS
00650   238*    C                                SPEED VS. VACUUM...891 TABLE
00651   239*       840 WRITE (IOUT,9700)KA,KB
00655   240*          WRITE (IOUT,9612)
00657   241*          WRITE (IOUT,9608)
00661   242*          WRITE (IOUT,9720)
00663   243*          WRITE (IOUT,9724) (K, K = 1,27)
00671   244*          FACT = 100.0/TOTSPD
00672   245*          KTAB = 3
00673   246*          GO TO 722
00673   247*    C
00673   248*    C
00673   249*    C                                REVOLUTIONS
00673   250*    C                                SPEED VS. VACUUM...81 TABLE
00674   251*       860 WRITE (IOUT,9608)
00676   252*          WRITE (IOUT,9740)
00700   253*          WRITE (IOUT,9742)
00702   254*          FACT = 100.0/TOTSPD
00703   255*          LTAB = 3
00704   256*          GO TO 742
00704   257*    C
00705   258*       844 WRITE (IOUT,9006)
00707   259*       846 CALL SUB66
00710   260*          RETURN
00711   261*          END

   END OF LISTING.      0 *DIAGNOSTIC* MESSAGE(S).
TALOUT            SYMBOLIC
TALOUT  CODE      RELOCATABLE                20 JUL 67  09:27:47   0  01056404   14   261  (DELETED)
                                             20 JUL 67  09:27:47   1  01053710   24     1  (DELETED)
                                                                   0  01053740   14    94
```

12:13:58 @ FOR,* SUB66,SUB66
COMPILATION BY UNIVAC 1107 FORTRAN-IV DATED JUNE 22,1965 F4008
THIS COMPILATION WAS DONE ON 30 AUG 67 AT 12:13:58

SUBROUTINE SUB66 ENTRY POINT 003506

STORAGE USED (BLOCK, NAME, LENGTH)

0001	*CODE	003525
0002	*DATA	002663
0000	*BLANK	040641

EXTERNAL REFERENCES (BLOCK, NAME)

0003	EOF
0004	NREW$
0005	NRBU$
0006	NIO1$
0007	NIO2$
0010	NWDU$
0011	NWEF$
0012	NRDU$

STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

0001	000232 100L	0001	001444 1044G	0001	000315 111L	0001	001610 1123G	0001	001630 1134G
0001	001716 1167G	0001	001727 1175G	0001	000327 118L	0001	001766 1215G	0001	002156 1320G
0001	002174 1332G	0001	002303 1367G	0001	002337 1407G	0001	002356 1421G	0001	002360 1424G
0001	002405 1436G	0001	002500 1501G	0001	002520 1512G	0001	002540 1523G	0001	002545 1527G
0001	002565 1540G	0001	002605 1551G	0001	002012 1601L	0001	000360 163L	0001	002205 1631L
0001	002264 1634L	0001	000450 165L	0001	000452 166L	0001	002620 1700L	0001	002625 1711L
0001	002667 1712L	0001	000006 172G	0001	003134 1723L	0001	003137 1724L	0001	000015 176G
0001	003242 1764G	0001	003261 1774G	0001	003147 1799L	0001	003172 1800L	0001	003200 1801L
0001	003252 1814L	0001	003275 1816L	0001	003405 1817L	0001	003365 1826L	0001	001773 2006L
0001	000020 201G	0001	003333 2016G	0001	003351 2031G	0001	003411 2100L	0001	003415 2103L
0001	003420 2104L	0001	003433 2108L	0001	003435 2116L	0001	000042 212G	0001	003467 2121L
0001	000050 215G	0001	000062 221G	0001	000065 224G	0001	000111 236G	0001	000117 241G
0001	000131 245G	0001	000134 250G	0001	000171 270G	0001	000202 276G	0001	000725 304L
0001	000734 308L	0001	000736 310L	0001	000213 311G	0001	000222 317G	0001	000746 320L
0001	000752 322L	0001	000236 331G	0001	001257 333L	0001	001262 334L	0001	001276 335L
0001	001300 337L	0001	001325 339L	0001	000261 344G	0001	001313 350L	0001	001337 400L
0001	000467 4000L	0001	000525 4020L	0001	000535 4024L	0001	000542 4030L	0001	001347 404L
0001	000560 4040L	0001	001362 405L	0001	000565 4050L	0001	001372 406L	0001	000572 4060L
0001	000602 4087L	0001	000605 4088L	0001	000610 4090L	0001	000612 4091L	0001	000615 4092L
0001	000620 4093L	0001	001402 410L	0001	001503 436L	0001	001556 439L	0001	001776 440L
0001	002003 444L	0001	001077 450L	0001	001246 457L	0001	000622 6207L	0001	000650 700L
0001	000757 708L	0001	000771 710L	0001	001112 716G	0001	001071 716L	0001	001030 728L
0001	001035 729L	0001	001042 730L	0001	001045 732L	0001	001050 734L	0001	001172 737G
0002	002453 8104F	0001	000325 8109L	0001	000353 8162L	0002	002057 8204F	0001	001220 8453L
0001	002704 8720L	0002	001772 9115F	0002	001776 9116F	0002	002026 9117F	0002	001765 9168F
0002	002050 9202F	0002	002100 9204F	0002	002261 9301F	0002	002267 9302F	0002	002277 9303F
0002	002303 9304F	0002	002370 9310F	0002	002377 9314F	0002	002450 9315F	0002	002444 9320F
0002	002041 9435F	0002	002037 9454F	0002	002105 9601F	0002	002115 9602F	0002	002125 9603F

```
0002    002135 9604F
0002    002206 9638F
0002    002254 9661F
0002    002425 9802F
0002    002104 9991F
0002 R  001757 AVE
0002 R  001614 C
0000 R  012222 CISPD
0000    001076 DU108
0002 R  001742 FINC
0000    000004 IDIP
0000    000020 IGOOD
0002 I  001764 ILRPM
0000 I  000017 INDATA
0000 I  000001 IOUT
0002 I  001670 ISPD
0002 I  001732 JBASE
0002 I  001710 JL
0002 I  001671 JSPD
0002 I  001755 J4
0000 I  000013 KB
0002 I  001713 KDURL
0000 I  000010 KSEVEN
0002 I  000000 L
0002 I  001645 LLCAT
0002 I  001524 LMAKEB
0002 I  001703 LPOW
0002 I  001754 L3
0000 I  000060 MG
0000 I  000044 MP
0000 I  000110 MS
0002 I  001640 N
0000 I  023230 NGCUM
0000 I  000011 NRUNS
0000 I  000007 NUMGR
0002 R  001743 SEC
0002 R  001723 SPDLL
0002 R  001501 TEMP
0002 R  001657 VAC
0000    000150 VZT

0002    002147 9605F
0002    002230 9641F
0002    002307 9700F
0002    002435 9822F
0002 R  001650 ALSPD
0002 R  001736 AVERPM
0000 R  020226 CASPD
0000 R  015224 CIVAC
0000    000352 DU81
0002 I  001634 I
0000 I  000014 IDLRPM
0002 I  001635 II
0000 I  010621 INCID
0002 I  001664 INPOW
0002 I  001674 IPOW
0002 I  001716 ISPDL
0002 I  001751 JCARD
0002 I  001740 JLAST
0002 I  001721 JSUB
0002 I  001756 J5
0000 I  000025 KBLOW
0002 I  001666 KIDLE
0002 I  001672 KSPD
0002 I  001675 LCAT
0002 I  001725 LLGEAR
0002 I  001556 LOPA
0002 I  001700 LSPD
0002 I  001641 M
0002 I  001665 MGEAR
0000 I  000134 MPIN
0002 I  001660 MSPD
0002 I  000053 NACAT
0002 I  000022 NGSEC
0000 I  007220 NSEC
0002 R  001760 PCTD
0002 R  001661 SPD
0000    001312 SP108
0002 R  001735 TOTREV
0002 R  001673 VACI
0000 R  000160 ZTA

0002    002160 9606F
0002    002234 9645F
0002    002332 9702F
0002    002504 9823F
0002 R  001714 ALSPDL
0002 R  001744 AVESPD
0002 R  001471 CATRPM
0000 R  013623 CLSPD
0000    003416 DU891
0002 I  001763 IARPM
0000    000005 IDRUM
0000    000000 IIN
0000    000204 INC108
0000    000662 IN108
0002 I  001717 IPOWL
0002 I  001646 ITOT
0002 I  001652 JCHG
0002 I  001711 JLL
0002 I  001676 J1
0002 I  001636 K
0000    000023 KD
0002 I  001653 KODE
0002 I  001752 KTAB
0002 I  000010 LG
0002 I  001753 LLINES
0002 I  001562 LOPB
0002 I  001536 LTESTA
0000 I  000124 MAT
0002 I  001704 MJDF
0000 I  000022 MPJVAC
0000 I  000074 MV
0002 I  000062 NAPOW
0002 I  000033 NGSECL
0000 I  000021 NSLAVE
0002 R  001761 PCTR
0002 R  001726 SPDI
0000    000516 SP81
0000 R  007176 TOTRPM
0002 R  001720 VACIL
0000 R  000161 ZTB

0002    002172 9608F
0002    002245 9650F
0002    002355 9722F
0002    002520 9824F
0002 R  001647 ALVAC
0002 R  001604 B
0002 R  001475 CATSEC
0000 R  016625 CLVAC
0003 R  000000 EOF
0000 I  000006 IAVE
0000    000015 IDSPD
0002 I  001762 IIRPM
0000    000203 INC81
0000    000206 IN81
0002 I  001655 IPT
0000 I  000016 IVAC
0002 I  001637 JJ
0002 I  001712 JLLL
0002 I  001733 J2
0000 I  000012 KA
0000 I  000027 KDIAGN
0000    000164 KODEZT
0000 I  000125 K7
0002 I  001702 LGEAR
0002 I  001552 LLOAD
0002 I  001566 LOPC
0002 I  001542 LTESTB
0002 I  001706 MCAT
0002 I  001705 MLDF
0002 I  001662 MPOW
0002 I  001656 MVAC
0002 I  000044 NASP
0000 I  000030 NOAVE
0002    002640 NTEMPS
0002 R  001745 RRPM
0002 R  001722 SPDIL
0000    005306 SP891
0000 R  000201 TOTSEC
0002 R  001701 VACL
0000 R  000162 ZTC

0002    002202 9609F
0002    002251 9660F
0002    002402 9800F
0002    002250 9990F
0002 R  001715 ALVACL
0002 R  001746 BUFF
0000 R  021627 CAVAC
0000 R  000165 D
0002 R  001747 FACT
0000 I  000003 IDIA
0002 I  001731 IFS
0002 I  001730 IIS
0000    000205 INC891
0000    001526 IN891
0000 I  000002 IREF
0002 I  001642 J
0002 I  001741 JJJ
0002 I  001707 JM
0002 I  001734 J3
0002 I  001654 KARD
0002 I  001644 KDUR
0000 I  000023 KSCSC
0002 I  000070 K769
0002 I  001651 LINES
0002 I  001512 LMAKEA
0002 I  001643 LPMK
0002 I  001546 LTESTC
0002 I  001677 MFSP
0002 I  001750 MMM
0002 I  001663 MPPP
0000    000033 MV9
0000 I  007200 NCHG
0002 I  001572 NPIN
0000 I  007177 NTOTCH
0002 R  001737 RSEC
0002 R  001727 SPDL
0002 R  001667 SUMRPM
0000    000202 TOTSPD
0002 R  001724 VACLL
0000 R  000163 ZTD
```

```
00101     1*
00101     2*    C
00101     3*    C
00101     4*    C
00101     5*    C
00101     6*    C
00101     7*    C
00101     8*    C
00101     9*    C
00101    10*    C
00101    11*    C
00101    12*    C
00101    13*    C
00101    14*    C
```

SUBROUTINE SUB66

SUB66.....SLAVE UNIT SUBCATEGORIZER
BASED ON IBM1620 PROGRAM ...MODES...NOV. 22, 1966 8 AM

06560
06730

NOTE...THIS PROGRAM USES IABS(LLL) = ABS. VALUE OF LLL

```
00101    15*   C
00103    16*         COMMON IIN,IOUT,IREF,IDIA,IDIP,IDRUM,IAVE,NUMGR,KSEVEN,NRUNS
00104    17*         COMMON KA,KB,IDLRPM,IDSPD,IVAC,INDATA,IGOOD,NSLAVE,MPJVAC,KD(8)
00105    18*         COMMON     MV9(9),MP(12),MG(12),MV(12),MS(12),MAT,K7(7)
00106    19*         COMMON MPIN(12)
00107    20*         COMMON VZT(8),ZTA,ZTB,ZTC,ZTD,KODEZT
00110    21*         COMMON D(12)
00111    22*         COMMON TOTSEC,TOTSPD,INC81,INC108,INC891
00112    23*         COMMON     IN81(10,10),DU81(10,10),SP81(10,10)
00113    24*         COMMON     IN108(5,28),DU108(5,28),SP108(5,28)
00114    25*         COMMON     IN891(34,28),DU891(34,28),SP891(34,28)
00115    26*         COMMON TOTRPM,NTOTCH,NCHG(16)
00116    27*         COMMON     NSEC(769),INCID(769),CISPD(769),CLSPD(769),
00116    28*        1   CIVAC(769),CLVAC(769),CASPD(769),CAVAC(769),NGCUM(769,9)
00117    29*         DIMENSION L(8),LG(10)
00120    30*         DIMENSION NGSEC(9),NGSECL(9)
00121    31*         DIMENSION NASP(7),NACAT(7),NAPOW(6),K769(769)
00122    32*         DIMENSION CATRPM(4),CATSEC(4),TEMP(9)
00123    33*         DIMENSION LMAKEA(10),LMAKEB(10),LTESTA(4),LTESTB(4)
00124    34*         DIMENSION LTESTC(4),LLOAD(4),LOPA(4),LOPB(4),LOPC(4)
00125    35*         DIMENSION NPIN(10)
00126    36*         DIMENSION B(8),C(16)
00127    37*         EQUIVALENCE (KD(1),KSCSC),(KD(3),KBLOW),(KD(5),KDIAGN)
00130    38*         EQUIVALENCE (KD(6),NOAVE)
00131    39*         DATA (LMAKEA(I), I=1,10)/5H      ,5HCHEVR,5HFORD ,5HDODGE,5HG.M.C.
00131    40*        1       5HI.H.C,4*5H     /
00133    41*         DATA (LMAKEB(I), I=1,10)/5H      ,5HOLET ,2*5H      ,2*5H.     ,
00133    42*        1       4*5H     /
00135    43*         DATA(LTESTA(I), I=1,4)/5H      ,5HROAD , 5HTRACK,5HDYNAM/
00137    44*         DATA (LTESTB(I), I=1,4)/5H     ,5HROUTE,5H CYCL,5HOMETE/
00141    45*         DATA (LTESTC(I), I=1,4)/2*5H      ,5HE      ,5HR      /
00143    46*         DATA (LLOAD(I), I=1,4)/4H     ,4HNONE,4HHALF,4HFULL/
00145    47*         DATA (LOPA(I), I=1,4)/5H      ,5HLOS A,5HSAN F,5HDETRO/
00147    48*         DATA (LOPB(I), I=1,4)/5H      ,5HNGELE,5HRANCI,5HIT    /
00151    49*         DATA (LOPC(I), I=1,4)/5H      ,5HS     ,5HSCO   ,5H     /
00153    50*         DATA (LG(I),I=1,10)/1HN,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/
00155    51*         DATA (L(I),I=1,8)/3H    ,3H-DE,3H-AC,3H    ,3HIDL,3HCRU,3H AC,3H DE/
00157    52*         DATA (NASP(I),I=1,7)/4H 300,4H 900,4H1500,4H2100,4H2700,4H3500,
00157    53*        1              4H     /
00161    54*         DATA (NACAT(I),I=1,4)/3HIDL,3HCRU,3HACC,3HDEC/
00163    55*         DATA (NAPOW(I),I=1,6)/2HFP,2HPP,2HDP,2HCT,2HID,2H  /
00165    56*         DATA (NPIN(I),I=1,10)/ 2H  ,2H 1,2H 2,2H 3,2HCT, 2H 5,2H 6,
00165    57*        1                  2H 7, 2H 8,2H 9/
00165    58*   C
00165    59*   C
00165    60*   C
00165    61*   C     PREFILLS FOR OUTPUT OF SUBCATEGORY TITLES
00165    62*   C
00165    63*   C
00167    64*    1001 K769(1) = 17755                    IDLE
00167    65*   C
00170    66*         II = 2                             CRUISE
00171    67*         DO 1012 K=1,6
00174    68*         JJ = 20000 + 1100*K
00175    69*    1021 DO 1002 N=1,4
00200    70*         DO 1002 M=1,4
00203    71*         K769(II) = JJ + 10*N + M
00204    72*    1002 II = II + 1
```

```
00207    73*     1012 CONTINUE
00207    74*   C
00211    75*          DO 1013 J=1,6                    ACCELERATION
00214    76*          DO 1013 K=J,6
00217    77*          JJ = 30000 + 1000*J + 100*K
00220    78*     1031 DO 1003 N=1,4
00223    79*          DO 1003 M=1,4
00226    80*          K769(II) = JJ + 10*N + M
00227    81*     1003 II = II + 1
00232    82*     1013 CONTINUE
00232    83*   C                                      DECELERATION
00235    84*          DO 1014 J=1,6
00240    85*          DO 1014 K=1,J
00243    86*          JJ = 40000 + 1000*J + 100*K
00244    87*     1041 DO 1004 N=1,4
00247    88*          DO 1004 M=1,4
00252    89*          K769(II) = JJ + 10*N + M
00253    90*     1004 II = II + 1
00256    91*     1014 CONTINUE
00256    92*   C
00256    93*   C                                                                  06510
00256    94*   C      BEFORE THE FIRST PGINTU
00256    95*   C
00261    96*        88 LPMK = 1
00262    97*           KDUR = -2
00263    98*           LLCAT = -4
00264    99*           ITOT = 0
00265   100*           ALVAC = 0.0
00266   101*           ALSPD = 0.0
00267   102*           DO 89 I=1,9
00272   103*        89 NGSEC(I) = 0
00274   104*           LINES = 52
00274   105*   C
00274   106*   C      ZERO STORAGES FOR CUMULATIONS
00274   107*   C
00275   108*           DO 50 I=1,MAT
00300   109*           INCID(I) = 0
00301   110*           NSEC(I) = 0
00302   111*           CISPD(I) = 0.0
00303   112*           CLSPD(I) = 0.0
00304   113*           CASPD(I) = 0.0
00305   114*           CIVAC(I) = 0.0
00306   115*           CLVAC(I) = 0.0
00307   116*           CAVAC(I) = 0.0
00310   117*           DO 50 J = 1,9
00313   118*        50 NGCUM(I,J) = 0
00313   119*   C
00313   120*   C
00316   121*           DO 56 I = 1,16
00321   122*        56 NCHG(I) = 0
00323   123*           NTOTCH = 0
00324   124*           JCHG = 0
00324   125*   C
00325   126*           REWIND IREF
00326   127*           REWIND IDIA
00326   128*   C
00326   129*   C
00326   130*   C      PICK UP 12 PGINTU FROM THE IREF TAPE  OR  EQUIVALENT DRUM
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```
00326   131*   C
00326   132*   C
00327   133*     100 READ  (IREF) (MPIN(I),MP(I),MG(I),MV(I),MS(I), I=1,12),KODE,KARD
00327   134*   C
00327   135*   C      INDIVIDUAL PGINTU PROCESSING LOOP
00327   136*   C
00343   137*     106 DO 170 IPT = 1,12
00343   138*   C
00343   139*   C      PICK UP AND STORE MPOW,MGEAR,VAC=MVAC, AND SPD=MSPD
00343   140*   C
00346   141*         MVAC = MV(IPT)
00347   142*         VAC = MVAC
00350   143*         MSPD = MS(IPT)
00351   144*         SPD = MSPD
00351   145*   C
00351   146*   C      TEST FOR ZERO ENDER
00351   147*   C
00352   148*         IF (MVAC)  108,322,108
00352   149*   C
00355   150*     108 MPOW = MP(IPT)
00356   151*         MPPP = MPOW
00357   152*         INPOW = MPIN(IPT) + 1
00360   153*         MGEAR = MG(IPT) + 1
00361   154*         IF (MGEAR - 10) 111,110,111
00364   155*     110 MGEAR = 1
00364   156*   C                                DEFAULT VALUE IF THERE ARE NO MGEAR DATA
00364   157*   C
00365   158*     111 KIDLE = 0
00366   159*         IF (MPOW - 5)  118,8108,8109
00371   160*    8108 KIDLE = 1
00372   161*    8109 MPOW = 4
00372   162*   C
00373   163*     118 KDUR = KDUR + 1
00374   164*         ALSPD = ALSPD + SPD
00375   165*         ALVAC = ALVAC + VAC
00376   166*         NGSEC(MGEAR) = NGSEC(MGEAR) + 1
00376   167*   C
00376   168*   C      TEST FOR FIRST PGINTU
00376   169*   C
00377   170*     160 IF (KARD - 1) 8162,162,8162
00402   171*     162 IF (IPT - 2) 163,8162,8162
00402   172*   C
00402   173*   C      SUMRPM IS INTEGRATED SUM OF RPM...TRAPEZOIDAL RULE
00402   174*   C
00405   175*    8162 SUMRPM = SUMRPM + 40.0*SPD
00406   176*         GO TO 4000
00406   177*   C
00406   178*   C      SPECIALS FOR FIRST PGINTU ... THE FIRST POINT OF THE DATA
00406   179*   C
00407   180*     163 ISPD = MSPD
00410   181*         JSPD = MSPD
00411   182*         KSPD = MSPD
00412   183*         VACI = VAC
00413   184*         IPOW = MPOW
00414   185*         SUMRPM = 20.0*SPD
00415   186*         LCAT = 0
00415   187*   C
00416   188*         IF (KSCSC) 165,165,167
```

```
00421   189*      167 LINES = 1
00422   190*          J1 = 40*MSPD
00423   191*          WRITE (IDIA,9115)KA,KB
00427   192*          WRITE (IDIA,9116)
00431   193*          WRITE (IDIA,9168) ITOT,J1,MVAC,NPIN(INPOW),NAPOW(MPPP),LG(MGEAR)
00441   194*       9168 FORMAT (I5,21X,2I4,2(3X,A2),3X,A1)
00442   195*      165 MFSP = 1
00442   196*    C                    TO PICK UP SECOND PGINTU
00443   197*      166 LSPD = MSPD
00444   198*          VACL = VAC
00445   199*          LGEAR = MGEAR
00446   200*          LPOW = MPOW
00447   201*      170 CONTINUE
00447   202*    C                    END OF PGINTU PROCESSING LOOP
00451   203*          GO TO 100
00451   204*    C                    FOR A NEW SET OF 12 PGINTU FROM TAPE  IREF OR DRUM
00451   205*    C
00451   206*    C
00451   207*    C     DETERMINATION OF MCAT
00451   208*    C
00451   209*    C     CODING SYSTEM FOR CATEGORIES
00451   210*    C
00451   211*    C                          MCAT  L(MCAT+5)
00451   212*    C        UNASSIGNED         -4    BLANK
00451   213*    C        CR. DEC.           -3     -DE   4087
00451   214*    C        CR. ACC.           -2     -AC   4088
00451   215*    C        NOT USED           -1    BLANK
00451   216*    C        IDLE                0     IDL   4090
00451   217*    C        CRUISE              1     CRU   4091
00451   218*    C        ACC.                2      AC   4092
00451   219*    C        DEC.                3      DE   4093
00451   220*    C                                       4095 IS EXIT
00451   221*    C
00451   222*    C     IDLE IF MPOW = 5
00451   223*    C
00452   224*       4000 IF (KIDLE) 4006,4006,4090
00452   225*    C
00455   226*       4006 MJDF = MSPD - JSPD
00456   227*            MLDF = MSPD - LSPD
00456   228*    C
00457   229*            IF (MLDF - 2) 4008,4030,4092
00462   230*       4008 IF (MLDF + 2) 4093,4010,4020
00462   231*    C
00465   232*       4010 IF (LCAT + 2) 4087,4040,4012
00470   233*       4012 IF (LCAT - 1) 4091,4060,4014
00473   234*       4014 IF (LCAT - 3) 4088,4093,4093
00473   235*    C
00476   236*       4020 IF (LCAT + 2) 4050,4040,4022
00501   237*       4022 IF (LCAT - 1) 4091,4060,4024
00504   238*       4024 IF (LCAT - 3) 4088,4087,4087
00504   239*    C
00507   240*       4030 IF (LCAT + 2) 4050,4088,4032
00512   241*       4032 IF (LCAT - 1) 4091,4060,4024
00515   242*       4034 IF (LCAT - 3) 4092,4087,4087
00515   243*    C
00520   244*       4040 IF (MJDF - 2) 4091,4088,4088
00520   245*    C
00523   246*       4050 IF (MJDF + 2) 4087,4087,4091
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00523   247*   C
00526   248*    4060 IF (MJDF - 1) 4062,4091,4088
00531   249*    4062 IF (MJDF + 1) 4087,4091,4091
00531   250*   C
00531   251*   C                  CR. DEC.
00534   252*    4087 MCAT = -3
00535   253*         GO TO 6207
00535   254*   C
00535   255*   C                  CR. ACC.
00536   256*    4088 MCAT = -2
00537   257*         GO TO 6207
00537   258*   C
00537   259*   C                  IDLE
00540   260*    4090 MCAT =  0
00541   261*         GO TO 6207
00541   262*   C
00541   263*   C                  CRUISE OR CONSTANT-SPEED
00542   264*    4091 MCAT =  1
00543   265*         GO TO 6207
00543   266*   C
00543   267*   C                  ACC.
00544   268*    4092 MCAT =  2
00545   269*         GO TO 6207
00545   270*   C
00545   271*   C                  DEC.
00546   272*    4093 MCAT =  3
00546   273*   C
00546   274*   C
00546   275*   C     MCAT HAS BEEN ESTABLISHED
00546   276*   C                       BASED ON KIDLE, MSPD, LSPD, JSPD, LCAT
00546   277*   C
00546   278*   C
00547   279*    6207 IF (KSCSC) 304,304,115
00552   280*     115 IF (LINES - 52) 700,116,116
00555   281*     116 LINES = 0
00556   282*         WRITE (IDIA,9115)KA,KB
00562   283*    9115 FORMAT (9H1RUN NO.  ,A4,A5/)
00563   284*         WRITE (IDIA,9116)
00565   285*    9116 FORMAT (50H ITOT JSPD KSPD LSPD MSPD MSPD MVAC INP  POW GEAR ,
00565   286*        1     45HLLCAT LCAT MCAT   M SEC. LCAT ISPD LSPD  IPOW,
00565   287*        2     30H LPOW TIME  JCHG  NCHG  TOT CH/)
00566   288*     700 J1 = 40*MSPD
00567   289*     117 WRITE (IDIA,9117) ITOT,JSPD,KSPD,LSPD,MSPD,J1,MVAC,
00567   290*        1     NPIN(INPOW), NAPOW(MPPP),LG(MGEAR),
00567   291*        1      L(LLCAT+5),L(LCAT+5),L(MCAT+5),KDUR
00607   292*    9117 FORMAT (I5,I4,3I5,I6,I4,2(3X,A2),3X,A1,2(3X,A3),2X,A3,I8)
00610   293*         LINES = LINES + 1
00610   294*   C
00611   295*     304 JM = IABS(MCAT)
00612   296*         IF (MFSP) 320,306,306
00612   297*   C
00612   298*   C     SECOND PGINTU ONLY ... I.E. THE SECOND DATA POINT
00612   299*   C
00615   300*     306 MFSP = -1
00615   301*   C
00616   302*     308 LCAT = MCAT
00617   303*     310 ITOT = ITOT + 1
00617   304*   C
```

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00620   305*      318 JSPD = KSPD
00621   306*          KSPD = LSPD
00622   307*          GO TO 166
00622   308*    C               EVENTUALLY BACK TO INPUT OF NEW PGINTU
00622   309*    C
00622   310*    C     BASIC DECISION...IS MCAT SAME AS LCAT
00622   311*    C
00623   312*      320 IF (LCAT - MCAT) 708,310,708
00623   313*    C
00623   314*    C     FROM LAST PGINTU ZERO ENDER
00623   315*    C
00626   316*      322 KDUR = KDUR + 1
00627   317*          LPMK = 0
00630   318*          GO TO 710
00630   319*    C
00631   320*      708 ALSPD = ALSPD - SPD
00632   321*          ALVAC = ALVAC - VAC
00633   322*          NGSEC(MGEAR) = NGSEC(MGEAR) - 1
00634   323*      710 JL = IABS(LCAT)
00635   324*          JLL = IABS(LLCAT)
00636   325*          M = 0
00636   326*    C
00636   327*    C     M = 0      NORMAL STORE
00636   328*    C     M = 1      CLL...CHAIN INTO LLCAT
00636   329*    C     M = 2      CL...NORMAL CHAIN
00636   330*    C     M = 3      STORE THOUGH KDUR = 1,2
00636   331*    C     M = 4      FIRST MODE CHANGE
00636   332*    C     M = 5      RM...RECYCLE WITHOUT STORE, CHAIN INTO MCAT
00636   333*    C     M = 6      RM...BUT ZERO ENDER...HANDLED LIKE M = 0
00636   334*    C
00637   335*      328 IF (LLCAT + 4) 729,729,329
00637   336*    C                                                UNASSIGNED
00642   337*      329 IF (JL - JLL) 711,730,711
00642   338*    C                                                NOT AC OR DE
00645   339*      711 IF (LCAT - 1) 712,712,333
00650   340*      712 IF (KDUR - 3) 714,333,333
00653   341*      714 IF (JM - JLL) 718,716,718
00656   342*      718 IF (LCAT) 728,724,724
00656   343*    C                                                AC + DE
00661   344*      724 IF (LLCAT + MCAT - 5) 734,732,734
00661   345*    C                                                (-AC) + (-DE)
00664   346*      728 IF (LLCAT + MCAT + 5) 734,716,734
00667   347*      729 JLLL = JL
00670   348*          M = 4
00671   349*          GO TO 337
00672   350*      730 M = 2
00673   351*          GO TO 450
00674   352*      732 M = 3
00675   353*          GO TO 333
00676   354*      734 M = 5
00677   355*          ALSPD = ALSPD + SPD
00700   356*          ALVAC = ALVAC + VAC
00701   357*          NGSEC(MGEAR) = NGSEC(MGEAR) + 1
00702   358*          IF (LPMK) 308,735,308
00705   359*      735 M = 6
00706   360*          GO TO 333
00706   361*    C
00707   362*      716 M = 1
```

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00710  363*          LCAT = LLCAT
00711  364*          JL = JLL
00711  365*    C
00711  366*    C     CORRECTIONS FOR CHAINING PROCESS
00711  367*    C
00712  368*      450 KDUR = KDUR + KDURL
00713  369*          ALSPD = ALSPD + ALSPDL
00714  370*          ALVAC = ALVAC + ALVACL
00715  371*          DO 451 I=1,9
00720  372*      451 NGSEC(I) = NGSEC(I) + NGSECL(I)
00722  373*          ISPD = ISPDL
00723  374*          IPOW = IPOWL
00724  375*          VACI = VACIL
00725  376*          JLL = JLLL
00726  377*          NSEC(JSUB) = NSEC(JSUB) - KDURL
00727  378*          INCID(JSUB) = INCID(JSUB) - 1
00730  379*          CISPD(JSUB) = CISPD(JSUB) - SPDIL
00731  380*          CLSPD(JSUB) = CLSPD(JSUB) - SPDLL
00732  381*          CIVAC(JSUB) = CIVAC(JSUB) - VACIL
00733  382*          CLVAC(JSUB) = CLVAC(JSUB) - VACLL
00734  383*          CASPD(JSUB) = CASPD(JSUB) - ALSPDL - SPDLL
00735  384*          CAVAC(JSUB) = CAVAC(JSUB) - ALVACL - VACLL
00736  385*          DO 452 I=1,9
00741  386*      452 NGCUM(JSUB,I) = NGCUM(JSUB,I) - NGSECL(I)
00743  387*          NGCUM(JSUB,LLGEAR) = NGCUM(JSUB,LLGEAR) - 1
00744  388*          IF (JCHG) 8453,8453,453
00747  389*      453 NCHG(JCHG) = NCHG(JCHG) - 1
00747  390*    C
00747  391*    C     OUTPUTS CORR.IF KBLOW = 1
00747  392*    C
00750  393*     8453 IF (KBLOW) 334,334,454
00753  394*      454 IF (LINES - 52) 457,455,455
00756  395*      455 LINES = 0
00757  396*          WRITE (IDIA,9115)KA,KB
00763  397*          WRITE (IDIA,9116)
00765  398*      457 WRITE (IDIA,9454)
00767  399*     9454 FORMAT (6H CORR.)
00770  400*          LINES = LINES + 1
00771  401*          GO TO 334
00771  402*    C
00771  403*    C     CUMULATE CATEGORY-TO-CATEGORY CHANGES IN 4 X 4 TABLE                03290
00771  404*    C
00772  405*      333 NTOTCH     = NTOTCH + 1
00773  406*      334 IF (JLL - JL) 834,335,834
00776  407*      834 JCHG =  4*JLL + JL + 1
00777  408*          NCHG(JCHG) = NCHG(JCHG) + 1
01000  409*      335 JLLL = JLL
01000  410*    C
01000  411*    C     SUBCATEGORY INCIDENCE AND DURATION                                03350
01000  412*    C                    ISUB         NSUB        INDEX...JSUB               03360
01000  413*    C       JL IS ABSOLUTE VALUE OF LCAT                                    03370
01000  414*    C                                                                       03380
01001  415*      337 SPDI = ISPD                                                       03390
01002  416*          SPDL = LSPD                                                       03400
01003  417*          IF (JL) 350,342,350                                               03410
01006  418*      342 JSUB = 1                                                          03500
01007  419*          GO TO 410                                                         03510
01007  420*    C                                                                       03520
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01010   421*      350 IIS = ISPD/15 + 1                                          03420
01011   422*          IF(IIS - 6) 339,339,338                                    03430
01014   423*      338 IIS = 6                                                    03440
01015   424*      339 IFS = LSPD/15 + 1                                          03450
01016   425*          IF(IFS - 6) 400,400,340                                    03460
01021   426*      340 IFS = 6                                                    03470
01021   427*    C                                                                03530
01022   428*      400 IF (JL - 2) 402,404,405
01022   429*    C
01022   430*    C     JBASE IS SUBCATEGORY INDEx EXCLUDING POWER                 03550
01022   431*    C
01022   432*    C
01022   433*    C     CRUISE AND CONST. SPEED...JL = 1 JBASE = 2 - 7
01022   434*    C
01025   435*      402 JBASE = IFS + 1                                            03570
01026   436*          GO TO 406                                                  03580
01026   437*    C
01026   438*    C     ACCELERATION...JL = 2          JBASE = 8 - 28              03600
01026   439*    C                                                                03610
01027   440*      404 JBASE = IFS + 7 + (IIS - 1) * (12 - IIS)/2                 03620
01030   441*          GO TO 406                                                  03630
01030   442*    C
01030   443*    C     DECELERATION...JL = 3          JBASE = 29 - 49             03650
01030   444*    C                                                                03660
01031   445*      405 JBASE = IFS + 28 + (IIS - 1) * IIS/2                       03670
01032   446*      406 JSUB = 16*JBASE + 4*IPOW + LPOW - 35
01032   447*    C
01032   448*    C     CUMULATE SUBCAT. SECONDS AND INCIDENCES
01032   449*    C
01033   450*      410 NSEC(JSUB) = NSEC(JSUB) + KDUR
01034   451*          INCID(JSUB) = INCID(JSUB) + 1
01034   452*    C
01034   453*    C     CUMULATE INITIAL AND FINAL SPEEDS AND VACUUMS
01034   454*    C
01035   455*          CISPD(JSUB) = CISPD(JSUB) + SPDI
01036   456*          CLSPD(JSUB) = CLSPD(JSUB) + SPDL
01037   457*          CIVAC(JSUB) = CIVAC(JSUB) + VACI
01040   458*          CLVAC(JSUB) = CLVAC(JSUB) + VACL
01040   459*    C
01040   460*    C     CUMULATE TOTAL SPEED,VAC,GEARS OVER INTERVAL
01040   461*    C
01041   462*          CASPD(JSUB) = CASPD(JSUB) + ALSPD
01042   463*          CAVAC(JSUB) = CAVAC(JSUB) + ALVAC
01043   464*          DO 412 I=1,9
01046   465*      412 NGCUM(JSUB,I) = NGCUM(JSUB,I) + NGSEC(I)
01046   466*    C
01046   467*    C     BLOW-BY-BLOW OUTPUT   IF KBLOW = 1                         03780
01046   468*    C        SHOWS PROGRESS OF SUBCATEGORIZING
01046   469*    C
01050   470*          IF(KBLOW) 439,439,434                                      03860
01053   471*      434 IF(LINES - 52) 436,435,435
01056   472*      435 LINES = 0
01057   473*          WRITE (IDIA,9115)KA,KB
01063   474*          WRITE (IDIA,9116)
01065   475*      436 J2 = 40*ISPD
01066   476*          J3 = 40*LSPD                                               04835
01067   477*          J1 = ITOT - 1
01070   478*          WRITE (IDIA,9435)M,KDUR,L(LCAT+5),J2,J3,NAPOW(IPOW),NAPOW(LPOW),
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01070   479*          1   J1,JCHG,NCHG(JCHG),NTOTCH
01105   480*     9435 FORMAT(67X,I2,I4,3X,A3,2I5,2(3X,A2),I6,I5,I6,I7)
01106   481*          LINES = LINES + 1
01106   482*    C
01107   483*      439 LLCAT = LCAT                                          03990
01110   484*          ISPDL = ISPD                                          03790
01111   485*          IPOWL = IPOW
01112   486*          LLGEAR = LGEAR
01113   487*          KDURL = KDUR
01114   488*          SPDIL = SPDI                                          03810
01115   489*          SPDLL = SPDL                                          03820
01116   490*          VACIL = VACI                                          03830
01117   491*          VACLL = VACL
01120   492*          ALSPDL = ALSPD - SPDL
01121   493*          ALVACL = ALVAC - VACL
01122   494*          DO 4391 I = 1,9
01125   495*     4391 NGSECL(I) = NGSEC(I)
01127   496*          NGSECL(LGEAR) = NGSECL(LGEAR) - 1
01127   497*    C
01127   498*    C                                                           03840
01130   499*      437 KDUR = 0                                              03730
01131   500*          ALSPD = SPDL + SPD                                    04000
01132   501*          ALVAC = VACL + VAC
01133   502*          DO 4371 I=1,9
01136   503*     4371 NGSEC(I) = 0
01140   504*          NGSEC(LGEAR) = 1
01141   505*          NGSEC(MGEAR) = NGSEC(MGEAR) + 1
01141   506*    C
01142   507*          IF (LPMK) 440,438,440                                 04010
01145   508*      438 TOTSEC = ITOT                                         04020
01146   509*          SPD = LSPD
01147   510*          SUMRPM = SUMRPM - 20.0*SPD
01150   511*          TOTREV = SUMRPM/60.0 + 0.5
01151   512*          AVERPM = SUMRPM/TOTSEC + 0.5
01152   513*          END FILE IDIA
01153   514*          REWIND IDIA
01154   515*          REWIND IREF
01154   516*    C
01154   517*    C     DIAGNOSTIC OUTPUT...CUMULATIONS
01154   518*    C
01155   519*          IF (KDIAGN) 1601,1601,2002
01160   520*     2002 WRITE (IOUT,9202),KA,KB
01164   521*     9202 FORMAT (27H1DIAGNOSTIC FOR SUB66..RUN ,A4,A5//)
01165   522*          WRITE (IOUT,8204) (J, J=2,8)
01173   523*     8204 FORMAT (41H JSUB   NSEC  INCID CISPD   CLSPD   CASPD,
01173   524*        1         39H   CIVAC   CLVAC   CAVAC     N       1 ,
01173   525*        2         I6,6I7/)
01174   526*          DO 2006 I=1,MAT
01177   527*          IF (INCID(I)) 2006,2006,2004
01202   528*     2004 WRITE (IOUT,9204)I,NSEC(I),INCID(I),CISPD(I),CLSPD(I),CASPD(I),
01202   529*        1      CIVAC(I),CLVAC(I),CAVAC(I),(NGCUM(I,J),J=1,9)
01221   530*     9204 FORMAT (1X,I4,2I6,6F8.1,I8,8I7)
01222   531*     2006 CONTINUE
01224   532*          GO TO 1601
01224   533*    C
01224   534*    C     1601 IS START OF OUTPUT SECTION                       04040
01224   535*    C
01225   536*      440 IF (MCAT) 444,442,442                                 04060
                                                                          04070
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01230   537*      442 KSPD = LSPD
01231   538*      444 ISPD = LSPD                                          04080
01232   539*          IPOW = LPOW                                          04090
01233   540*          VACI = VACL
01234   541*          GO TO 308
01234   542*  C                EVENTUALLY BACK TO HANDLING OF NEXT PGINTU
01234   543*  C
01234   544*  C
01234   545*  C                                                           04120
01234   546*  C      OUTPUT SECTION OF SUB66
01234   547*  C
01234   548*  C                                                           06520
01235   549*       9991 FORMAT(1H1)                                       06540
01236   550*       1601 WRITE (IOUT,9601) KA,KB,KSEVEN                    06750
01243   551*       9601 FORMAT (11H1RUN NUMBER,AX,A4,A5,42X,8HRUN CODE,9X,I7/)
01244   552*            J = K7(4) + 1
01245   553*            WRITE (IOUT,9602) NSLAVE,LMAKEA(J),LMAKEB(J)
01252   554*       9602 FORMAT (18H SLAVE UNIT NUMBER,I10,42X,4HMAKE,13X,2A5)
01253   555*            WRITE (IOUT,9603) INDATA,K7(3)
01257   556*       9603 FORMAT (14H TOTAL PUNCHED,I14,42X,12HWEIGHT CLASS,I6)
01260   557*            WRITE (IOUT,9604) ITOT,K7(1)
01264   558*       9604 FORMAT (14H TOTAL SECONDS,I14,42X,20HTRUCK IN GROUP   NO.,I3/)
01265   559*            J = K7(2) + 1
01266   560*            WRITE (IOUT,9605)IDLRPM,LTESTA(J),LTESTB(J),LTESTC(J)
01274   561*       9605 FORMAT (16H IDLE SPEED, RPM,I12,42X,12HKIND OF TEST,5X,3A5)
01275   562*            J = K7(6) + 1
01276   563*            WRITE (IOUT,9606) IVAC,LOPA(J),LOPB(J),LOPC(J)
01304   564*       9606 FORMAT (17H IDLE VACUUM, IN.,I11,42X,15HROUTE SIMULATED,2X,3A5/)
01305   565*            J = K7(7) + 1
01306   566*            WRITE (IOUT,9608) TOTREV,LLOAD(J)
01312   567*       9608 FORMAT (18H TOTAL REVOLUTIONS,F10.0,42X,4HLOAD,13X,A4)
01313   568*            WRITE (IOUT,9609) AVERPM
01316   569*       9609 FORMAT (9H AVE. RPM,F19.0////)
01316   570*  C
01316   571*  C      MAJOR CATEGORY CUMULATIONS ON TIME AND RPM BASIS
01316   572*  C
01316   573*  C                                                           06880
01317   574*       1615 DO 1616 K=1,4                                     06900
01322   575*            CATSEC(K) = 0.0
01323   576*       1616 CATRPM(K) = 0.0
01325   577*            RSEC = 100.0/TOTSEC
01326   578*            TOTRPM = 0.0
01326   579*  C
01327   580*            JLAST = 99                                         06960
01330   581*            K = 0                                              06970
01330   582*  C                                                           06980
01331   583*            DO 1634 JSUB = 1,MAT                               06990
01334   584*            JJJ = K769(JSUB)/10000
01335   585*            IF (JJJ - JLAST) 1630,1631,1630
01340   586*       1630 K = K + 1
01341   587*       1631 FINC = INCID(JSUB)                                07030
01342   588*            IF (FINC) 1634,1634,1632
01345   589*       1632 SEC = NSEC(JSUB)
01346   590*            CISPD(JSUB) = 40.0*CISPD(JSUB)/FINC
01347   591*            CLSPD(JSUB) = 40.0*CLSPD(JSUB)/FINC
01350   592*            CIVAC(JSUB) = CIVAC(JSUB)/FINC
01351   593*            CLVAC(JSUB) = CLVAC(JSUB)/FINC
01351   594*  C                                                           07090
```

```
01351   595*   C      AV. INIT. AND FINAL SPEED AND VAC. NOW IN CISPD, ETC.
01351   596*   C
01352   597*          AVESPD = CASPD(JSUB)/(FINC + SEC)
01353   598*          CASPD(JSUB) = AVESPD
01354   599*          CATRPM(K) = CATRPM(K) + SEC*AVESPD
01355   600*          TOTRPM = TOTRPM + SEC*AVESPD
01356   601*          CAVAC(JSUB) = CAVAC(JSUB)/(FINC + SEC)
01357   602*          CATSEC(K) = CATSEC(K) + SEC
01360   603*    1634 JLAST = JJJ
01360   604*   C                                                              07150
01360   605*   C      OUTPUT TABLE FOR MAJ. CAT. CUMULATIONS                  07160
01360   606*   C
01362   607*          WRITE (IOUT,9638)                                       07170
01364   608*    9638 FORMAT(27H MAJOR CATEGORY CUMULATIONS//
01364   609*         1       31H  MAJOR     ...PERCENTAGE ON..../
01364   610*         2       31H CATEGORY   TIME BASIS RPM BASIS/)
01364   611*   C
01365   612*          RRPM = 100.0/TOTRPM                                     07220
01366   613*          DO 1641 K=1,4
01371   614*          B(2*K-1) = RSEC*CATSEC(K)
01372   615*          B(2*K)   = RRPM*CATRPM(K)
01373   616*    1641 WRITE (IOUT,9641)NACAT(K),B(2*K-1),B(2*K)
01401   617*    9641 FORMAT (3X,A3,6X,F6.2,F10.2)
01401   618*   C
01401   619*   C      OUTPUT PERCENTAGE CHANGE TABLE                          07300
01401   620*   C                                                              07310
01402   621*    1642 WRITE (IOUT,9645)                                        07320
01404   622*    9645 FORMAT(////40H PERCENTAGE CATEGORY-TO-CATEGORY CHANGES/)
01405   623*         WRITE (IOUT,9650) (NACAT(K), K=1,4)
01413   624*    9650 FORMAT (6X,4(4X,A3)/)
01414   625*    9990 FORMAT(1H )
01414   626*   C                                                              07380
01415   627*          BUFF = NTOTCH                                           07390
01416   628*          JJJ = 1                                                 07400
01417   629*          FACT = 100.0/BUFF                                       07410
01420   630*          DO 1660 I=1,4                                           07420
01423   631*          DO 1658 MMM=1,4
01426   632*          BUFF = NCHG(JJJ)
01427   633*          TEMP(MMM) = FACT*BUFF                                   07450
01430   634*          C(JJJ) = TEMP(MMM)                                      07460
01431   635*    1658 JJJ = JJJ+1
01431   636*   C                                                              07470
01433   637*    1660 WRITE (IOUT,9660)NACAT(I),(TEMP(MMM), MMM=1,4)           07480
01443   638*    9660 FORMAT (3X,A3,1X,4F7.2)
01444   639*         WRITE (IOUT,9661) NTOTCH
01447   640*    9661 FORMAT (/3X,13HTOTAL CHANGES,14X,I5)
01447   641*   C
01447   642*   C      OUTPUT FOR AVERAGING
01447   643*   C
01450   644*    3000 IF (NOAVE) 1700,3001,1700
01453   645*    3001 WRITE (IAVE,9301) KA,KB,KSEVEN
01460   646*    9301 FORMAT (11X,4HRUN ,          A4,A5,44X,I7,5H    1)
01461   647*    3002 WRITE (IAVE, 9302) ZTA,ZTB,ZT6,ZTD,MPJVAC,IDLRPM,
01461   648*         1   IVAC,AVERPM,NUMGR,KSEVEN
01475   649*    9302 FORMAT (4X,F12.7,
01475   650*         1              3F11.7,I2,I4,I3,F6.0,I2,2X,I7,5H    2)
01476   651*         JCARD = 3
01477   652*         WRITE (IAVE, 9303) (D(I),I=1,8), KSEVEN,JCARD
```

```
01507  653*          JCARD = 4
01510  654*          WRITE (IAVE, 9304) (D(I),I=9,12), KSEVEN,JCARD
01520  655*          JCARD = 5
01521  656*          WRITE (IAVE, 9303) (B(I),I=1,7,2),(B(I),I=2,8,2),KSEVEN,JCARD
01535  657*          JCARD = 6
01536  658*          WRITE (IAVE, 9303) (C(I),I=1,8), KSEVEN,JCARD
01546  659*          JCARD = 7
01547  660*          WRITE (IAVE, 9303) (C(I),I=9,16),KSEVEN,JCARD
01557  661*     9303 FORMAT (14X,8F6.2,6X,I7,I5)
01560  662*     9304 FORMAT (14X,4F6.2,30X,I7,I5)
01561  663*          JCARD = 8
01561  664*    C
01561  665*    C                                                                    1  07510
01561  666*    C                                                                    1  08140
01561  667*    C     OUTPUT SUBCATEGORY TABLE                                          08150
01561  668*    C
01561  669*    C                                                                      08170
01562  670*     1700 KTAB = 0
01563  671*          LLINES = 52
01564  672*     1710 JSUB = 1
01565  673*     1711 FINC = INCID(JSUB)
01566  674*          IF (FINC) 1724,1724,8712
01566  675*    C
01571  676*     8712 IF (LLINES - 39) 1712,8714,8714
01574  677*     8714 LLINES = 0
01575  678*          L3 = 0
01576  679*          WRITE (IOUT,9601)KA,KB,KSEVEN
01603  680*          WRITE (IOUT,9700)
01605  681*     9700 FORMAT(/44H  NO. MAJ ..SPEED.. .POWER.  ...SPEED RPM...,
01605  682*         1        36H  .IN.  HG VACUUM  INCID DURAT AV DU,
01605  683*         2         19HR   PCT  PCT ON ENG)
01606  684*          WRITE (IOUT,9702)
01610  685*     9702 FORMAT (6X,38HCAT FROM  TO  FROM TO  INIT  AVE FINAL,
01610  686*         1        36H  INIT  AVE FINAL          SEC   TIME,
01610  687*         2         19H   DURAT  REV BASIS/)
01610  688*    C
01611  689*     1712 LLINES = LLINES + 1                                             08180
01612  690*          IF (L3 - 3) 8720,8718,8718
01615  691*     8718 WRITE (IOUT,9990)
01617  692*          L3 = 0
01620  693*     8720 L3 = L3 + 1
01621  694*          JJJ = K769(JSUB)
01622  695*          J1 = JJJ/10000
01623  696*          JJJ = JJJ - 10000*J1
01624  697*          J2  = JJJ/1000
01625  698*          JJJ = JJJ -  1000*J2
01626  699*          J3  = JJJ/100
01627  700*          JJJ = JJJ  -  100*J3
01630  701*          J4  = JJJ/10
01631  702*          J5  = JJJ  -   10*J4
01632  703*          SEC  = NSEC(JSUB)
01633  704*          IF (KTAB) 1814,1714,1814
01636  705*     1714 AVE  = SEC/FINC
01637  706*          PCTD = RSEC*SEC
01640  707*          PCTR = RRPM*SEC*CASPD(JSUB)
01641  708*          IIRPM = CISPD(JSUB) + 0.5
01642  709*          IARPM = 40.0*CASPD(JSUB) + 0.5
01643  710*          ILRPM = CLSPD(JSUB) + 0.5
```

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01644   711*          WRITE (IOUT,9722)JSUB,NACAT(J1),NASP(J2),NASP(J3),NAPOW(J4),
01644   712*         1       NAPOW(J5),IIRPM,IARPM,ILRPM,CIVAC(JSUB),CAVAC(JSUB),
01644   713*         2       CLVAC(JSUB),INCID(JSUB),NSEC(JSUB),AVE,PCTD,PCTR
01667   714*    9722 FORMAT (1X,I4,1X,A3,2(1X,A4),2(2X,A2),1X,3I5,F7.1,2F5.1,I7,I6,
01667   715*         1        F7.1,2F8.2)
01667   716*    C
01667   717*    C      OUTPUT FOR AVERAGING
01667   718*    C
01670   719*          IF (NOAVE) 1723,3010,1723
01673   720*    3010 WRITE (IAVE, 9310) JSUB,IIRPM,IARPM,ILRPM,CIVAC(JSUB),CAVAC(JSUB),
01673   721*         1      CLVAC(JSUB),INCID(JSUB),NSEC(JSUB),AVE,PCTD,PCTR,KSEVEN,JCARD
01713   722*    9310 FORMAT (I4,3I5,3F5.1,2I5,F6.1,2F6.2,6X,I7,I5)
01714   723*          JCARD = JCARD + 1
01714   724*    C
01715   725*    1723 CAVAC(JSUB) = PCTD
01716   726*    1724 IF (JSUB - MAT) 1798,1799,1799
01721   727*    1798 JSUB = JSUB + 1
01722   728*          GO TO 1711
01722   729*    C                                                                  08260
01723   730*    1799 WRITE (IOUT,9990)
01723   731*    C
01725   732*          IF (NOAVE) 1800,3015,1800
01730   733*    3015 WRITE (IAVE, 9314) KSEVEN,JCARD
01734   734*    9314 FORMAT (4H -98,64X,I7,I5)
01735   735*          JCARD = JCARD + 1
01735   736*    C
01735   737*    C      OUTPUT SUBCATEGORY TABLE WITH GEAR DATA
01735   738*    C
01736   739*    1800 KTAB = 1
01737   740*          LLINES = 52
01740   741*          JSUB = 1
01741   742*    1801 FINC = INCID(JSUB)
01742   743*          IF (FINC) 1826,1826,8722
01742   744*    C
01745   745*    8722 IF (LLINES - 39) 1712,8724,8724
01750   746*    8724 LLINES = 0
01751   747*          L3 = 0
01752   748*          WRITE (IOUT,9601)KA,KB,KSEVEN
01757   749*          WRITE (IOUT,9800)
01761   750*    9800 FORMAT(/41H  NO. MAJ ..SPEED.. .POWER.    PCT       ..
01761   751*         1      9(1H.),44HPERCENTAGE OF SUBCATEGORY TIME IN GEAR SHOWN,
01761   752*         2        11(1H.))
01762   753*          WRITE (IOUT,9802) (I, I=1,8)
01770   754*    9802 FORMAT (6X,35HCAT FROM  TO  FROM TO   DURAT     N,8I8/)
01771   755*          GO TO 1712
01771   756*    C
01772   757*    1814 FACT = 100.0/(SEC + FINC)
01773   758*          DO 1816 I=1,9
01776   759*          BUFF = NGCUM(JSUB,I)
01777   760*          IF (BUFF) 1815,1815,1816
02002   761*    1815 BUFF = 0.0
02003   762*    1816 TEMP(I) = FACT*BUFF
02005   763*    1824 WRITE (IOUT,9822)JSUB,NACAT(J1),NASP(J2),NASP(J3),NAPOW(J4),
02005   764*         1            NAPOW(J5),CAVAC(JSUB),(TEMP(I), I=1,9)
02022   765*    9822 FORMAT (1X,I4,1X,A3,2(1X,A4),2(2X,A2),10F8.2)
02022   766*    C                                                                  08570
02022   767*    C
02022   768*    C      OUTPUT FOR AVERAGING
```

```
02022   769*   C
02023   770*          IF (NOAVE) 1826,3020,1826
02026   771*    3020 WRITE (IAVE, 9320) JSUB,(TEMP(I),I=1,9),KSEVEN,JCARD
02037   772*    9320 FORMAT (I4,9F7.2,1X,I7,I5)
02040   773*          JCARD = JCARD + 1
02040   774*   C
02041   775*    1826 IF (JSUB - MAT) 1817,1818,1818
02041   776*   C
02044   777*    1818 IF (NOAVE) 2100,3025,2100
02047   778*    3025 WRITE  (IAVE, 9315) KSEVEN,JCARD
02053   779*    9315 FORMAT (4H -99,64X,I7,I5)
02054   780*          GO TO 2100
02054   781*   C
02055   782*    1817 JSUB = JSUB + 1
02056   783*          GO TO 1801
02056   784*   C
02056   785*   C      OUTPUT SEC.-BY-SEC. OR/AND BLOW-BY-BLOW
02056   786*   C
02057   787*    2100 IF (KBLOW) 2103,2102,2103
02062   788*    2102 IF (KSCSC) 2103,2116,2103
02065   789*    2103 CALL EOF($2108)
02066   790*    2104 READ (IDIA,8104)
02070   791*    2106 WRITE (IOUT,8104)
02072   792*          GO TO 2104
02073   793*    8104 FORMAT (38H                                    ,
02073   794*        1        38H                                    ,
02073   795*        2        38H                                    ,
02073   796*        3        18H                    )
02074   797*    2108 REWIND IDIA
02074   798*   C
02074   799*   C      END OF OUTPUT
02074   800*   C
02075   801*    2116 CALL EOF ($2121)
02076   802*         WRITE (IOUT,9823)KA,KB,KSEVEN
02103   803*    9823 FORMAT  (///14H******** RUN ,A4,A5,
02103   804*       1        14H.....RUN CODE,I8,15H DONE *********/  )
02104   805*         NRUNS = NRUNS + 1
02105   806*         WRITE (IOUT,9824) NRUNS
02110   807*    9824 FORMAT (I6,11H RUNS TOTAL/)
02110   808*   C
02111   809*         REWIND IREF
02112   810*    2121 RETURN
02112   811*   C
02113   812*         END                                                    08590
                                                                         08600

   END OF LISTING.     0 *DIAGNOSTIC* MESSAGE(S).
SUB66          SYMBOLIC                    20 JUL 67  09:28:16   0  01074112    14   812  (DELETED)
SUB66   CODE   RELOCATABLE                 20 JUL 67  09:28:16   1  01065512    24     1  (DELETED)
                                                                 0  01065542    14   236
```

```
12:14:27    @ CUR
   1.   TRW G
   2.   OUT G
   3.   TOC
```

ELEMENT TABLE

PTOEOF	CODE	RELOCATABLE	03 MAR 67	13:02:09	1	01036670	12	1	
					0	01036704	14	3	
PTOEOF		SYMBOLIC	03 MAR 67	13:02:09	0	01036756	14	18	
MODES	CODE	RELOCATABLE	20 JUL 67	09:27:37	1	01037352	24	1	(DELETED)
					0	01037402	14	76	
MODES		SYMBOLIC	20 JUL 67	09:27:37	0	01041452	14	377	(DELETED)
TALOUT	CODE	RELOCATABLE	20 JUL 67	09:27:47	1	01053710	24	1	(DELETED)
					0	01053740	14	94	
TALOUT		SYMBOLIC	20 JUL 67	09:27:47	0	01056404	14	261	(DELETED)
SUB66	CODE	RELOCATABLE	20 JUL 67	09:28:16	1	01065512	24	1	(DELETED)
					0	01065542	14	236	
SUB66		SYMBOLIC	20 JUL 67	09:28:16	0	01074112	14	812	(DELETED)
MODES		SYMBOLIC	30 AUG 67	12:13:47	0	01122262	14	377	
MODES	CODE	RELOCATABLE	30 AUG 67	12:13:47	1	01136570	21	1	
					0	01134520	14	76	
TALOUT		SYMBOLIC	30 AUG 67	12:13:58	0	01136615	14	261	
TALOUT	CODE	RELOCATABLE	30 AUG 67	12:13:58	1	01150367	17	1	
					0	01145723	14	94	
SUB66		SYMBOLIC	30 AUG 67	12:14:26	0	01150410	14	812	
SUB66	CODE	RELOCATABLE	30 AUG 67	12:14:26	1	01205130	21	1	
					0	01176560	14	236	

ENTRY POINT TABLE

PTOEOF	(PTOEOF/CODE)	0	000000	SUB66	(SUB66/CODE)	1	003506	TALOUT	(TALOUT/CODE)	1	001267

BLOCK TABLE EMPTY

COBOL LIBRARY TABLE EMPTY

PROCEDURE NAME TABLE EMPTY

```
4.   TRI G
     END CUR
```

```
12:14:51    @ XQT MODES

          STARTING ADDRESS          CORE USAGE                    DRUM USAGE          BLANK COMMON
               014000          014000-027021   100000-105571         NONE             123137-163777

  MODES /CODE          NFOUT$/CODE          NTAB$ /ND            NBUFF$/CODE          NIO$  /ND           NRWND$/CODE
  1   014000-015173    1   015174-015367    0   100216-100272    1   015370-015440    0   101331-102100    1   021163-021221
  2   100000-100212    2   100213-100215    2   100273-100321    2   100322-101330    1   015441-021162

  TALOUT/CODE          SUB66 /CODE          NFINP$/CODE          NEXIT$/ND
  1   021222-022520    1   022521-026245    1   026246-026465    0   105445-105571
  2   102101-102544    2   102545-105427    2   105430-105444    1   026466-027021

12:14:56    END OF ALLOCATION
```

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12:35:27    @ FOR MODAVE,MODAVE
COMPILATION BY UNIVAC 1107 FORTRAN-IV DATED     JULY 4, 1966   ND2
THIS COMPILATION WAS DONE ON 28 MAR 67 AT 12:35:27

  MAIN PROGRAM          ENTRY POINT 000000

  STORAGE USED (BLOCK, NAME, LENGTH)

       0001   *CODE   002426
       0002   *DATA   042321
       0000   *BLANK  000000


  EXTERNAL REFERENCES (BLOCK, NAME)

       0003   EXIT
       0004   SQRT
       0005   NRDU$
       0006   NIO1$
       0007   NIO2$
       0010   NWDU$
       0011   NREW$
       0012   NSTOP$


  STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

 0001   001372 1007G      0001   000241 102L      0001   001444 1037G      0001   000255 104L      0001   001460 1050G
 0001   000270 106L       0001   000314 108L      0001   001551 1105G      0001   001567 1117G      0001   000422 116L
 0001   001676 1166G      0001   000006 12L       0001   000435 122L       0001   002215 1316G      0001   002326 1370G
 0001   002372 1407G      0001   000065 166G      0001   001755 1711L      0001   002022 1712L      0001   002114 1719L
 0001   002127 1722L      0001   002236 1724L     0001   002246 1799L      0001   000533 180L       0001   002261 1801L
 0001   002336 1814L      0001   002407 1818L     0001   002377 1826L      0001   000620 190L       0001   000645 192L
 0001   000662 194L       0001   000026 20L       0001   000115 207G       0001   000770 226L       0001   000777 227L
 0001   001001 228L       0001   001021 233L      0001   000154 234G       0001   001030 234L       0001   001043 238L
 0001   000045 24L        0001   000173 245G      0001   000176 252G       0001   000206 261G       0001   000223 272G
 0001   000054 30L        0001   000261 315G      0001   000102 32L        0001   000274 330G       0001   000110 34L
 0001   000321 346G       0001   000326 352G      0001   000350 367G       0001   000364 374G       0001   000405 410G
 0001   000441 430G       0001   000452 436G      0001   000465 444G       0001   000515 463G       0001   000543 475G
 0001   000553 502G       0001   000600 520G      0001   000714 563G       0001   000734 573G       0001   001005 617G
 0001   001107 651G       0001   001116 655G      0001   001121 660G       0001   001143 670G       0001   001151 673G
 0001   001163 677G       0001   001166 702G      0001   001212 713G       0001   001220 716G       0001   001232 722G
 0001   001235 725G       0001   001354 775G      0001   002037 8720L      0002   041362 9001F      0002   041316 9014F
 0002   041321 9020F      0002   041340 9022F     0002   041344 9024F      0002   041346 9030F      0002   041354 9032F
 0002   041366 9039F      0002   041376 9041F     0002   041364 9099F      0002   041404 9100F      0002   041412 9102F
 0002   041421 9107F      0002   041664 9108F     0002   041673 9109F      0002   041707 9110F      0002   041430 9112F
 0002   041713 9130F      0002   041715 9150F     0002   041433 9170F      0002   041442 9180F      0002   041445 9190F
 0002   041450 9193F      0002   041464 9301F     0002   041500 9305F      0002   041505 9306F      0002   041512 9307F
 0002   041517 9308F      0002   041546 9311F     0002   041523 9320F      0002   041530 9322F      0002   041537 9324F
 0002   041615 9638F      0002   041623 9639F     0002   041632 9640F      0002   041641 9641F      0002   041555 9645F
 0002   041565 9650F      0002   041576 9651F     0002   041650 9658F      0002   041606 9660F      0002   041724 9700F
 0002   041751 9702F      0002   041776 9722F     0002   042015 9799F      0002   042024 9800F      0002   042047 9802F
 0002   042066 9818F      0002   042057 9822F     0002   041363 9990F      0002 R 040752 A          0002 R 041265 AVE
 0002 R 034446 B          0002 R 041267 CONF       0002 R 041310 C1       0002 R 041311 C2         0002 R 041261 DF
 0002 R 037261 DSQ        0002 R 041274 FI         0002 R 041256 FNAVE    0002 R 017035 G          0002 I 041226 I
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0002 I 041272 IA          0002 I 041232 IAVE        0002 I 041240 ID          0002 I 041250 II          0002 I 041230 IIN
0002 I 041231 IOUT        0002 I 041241 IRUN        0002 I 041271 IV          0002 I 041246 I2          0002 I 041236 J
0002 I 041227 JBLANK      0002 I 041245 JCARD       0002 I 035660 JCT         0002 I 041255 JJ          0002 I 041302 JJJ
0002 I 041234 JOUT        0002 I 041244 JSUB        0002 I 041303 J1          0002 I 041304 J2          0002 I 041305 J3
0002 I 041306 J4          0002 I 041307 J5          0002 I 041251 K           0002 I 041242 KA          0002 I 041243 KB
0002 I 041253 KGR         0002 I 041254 KK          0002 I 035040 KRA         0002 I 035350 KRB         0002 I 041277 KTAB
0002 I 041313 K1          0002 I 041314 K2          0002 I 041315 K3          0002 I 041312 K4          0002 I 000023 K769
0002 I 041300 LLINES      0002 I 041301 L3          0002 I 041273 M           0002 I 041270 MPJVAC      0002 I 038530 N
0002 I 000007 NACAT       0002 I 000016 NAPOW       0002 I 000000 NASP        0002 I 041237 NAVE        0002 I 041260 NDF
0002 I 041235 NRUNS       0002   042315 NTEMP$      0002 I 041233 NTRUNS      0002 I 041252 NUMGR       0002 I 040747 N1
0002 I 040744 N2          0002 I 041034 N3          0002 R 041264 Q           0002 R 041257 R           0002 R 041262 RDF
0002 R 001424 S           0004 R 000000 SQRT        0002 R 041266 SSQ         0002 R 041263 T           0002 R 041036 TEE
0002 R 041275 X           0002 R 042100 Y           0002 R 040662 YSQ         0002 R 041276 ZT          0002 R 042100 ZTA
0002 R 042101 ZTB         0002 R 042102 ZTC         0002 R 042103 ZTD         0002 R 041247 ZZ
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00100     1*   C
00100     2*   C     MODAVE
00100     3*   C
00100     4*   C
00100     5*   C
00100     6*   C     AVERAGE DATA STORED ON ND AVERAGING TAPE
00100     7*   C
00100     8*   C     GEORGE W. THOMSON...ETHYL...DETROIT
00100     9*   C
00100    10*   C     PROBLEM DEFINITION DATE
00100    11*   C        BY C. WALCUTT  MAR. 27, 1967  10 AM
00100    12*   C
00100    13*   C     VERSION DATE    MARCH 27, 1967  11 AM
00100    14*   C
00101    15*         DIMENSION NASP(7),NACAT(7),NAPOW(5),K769(769)
00103    16*         DIMENSION S(769,9), G(769,9),Y(50),B(50),N(200)
00104    17*         DIMENSION  KRA(200),KRB(200),JCT(769)
00105    18*         DIMENSION DSQ(769),YSQ(50),N2(3),N1(3),A(50),N3(2)
00106    19*         DIMENSION TEE(120)
00107    20*         EQUIVALENCE (Y(1),ZTA),(Y(2),ZTB),(Y(3),ZTC),(Y(4),ZTD)
00110    21*         DATA (NASP(I),I=1,7)/4H 300,4H 900,4H1500,4H2100,4H2700,4H3500,
00110    22*        1           4H    /
00112    23*         DATA (NACAT(I),I=1,4)/3HIDL,3HCRU,3HACC,3HDEC/
00114    24*         DATA (NAPOW(I),I=1,5)/2HFP,2HPP,2HDP,2HCT,2H  /
00116    25*         DATA (N1(I), I=1,3)/6H.INCID,6H.DURAT,6HREVOLU/
00120    26*         DATA (N2(I), I=1,3)/5HENCE , 5HION  , 5HTIONS/
00122    27*         DATA (N3(I), I=1,2)/2H  ,2H**/
00124    28*         DATA JBLANK/4H    /
00124    29*   C
00124    30*   C     T-TABLE...TWO-SIDED 5 PER CENT POINTS FOR 1-120 DF
00124    31*   C
00126    32*         DATA (TEE(I),I=1,120)/12.706,4.303,3.182,2.776,2.571,2.447,2.365,
00126    33*        1     2.306,2.262,2.228,2.201,2.179,2.160,2.145,2.131,2.120,2.110,
00126    34*        2     2.101,2.093,2.086,2.080,2.074,2.069,2.064,2.060,2.056,2.052,
00126    35*        3     2.048,2.045,2.042,10*2.031,20*2.010,60*1.990/
00126    36*   C
00126    37*   C     SET LOGICAL UNIT NUMBERS FOR SYSTEM
00126    38*   C
00126    39*   C                 IIN     DATA CARD INPUT
00130    40*       1 IIN  = 5
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51<

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00130    41*   C                    IOUT    STANDARD OUTPUT
00131    42*         IOUT = 6
00131    43*   C                    IAVE    TAPE WITH STORED AVERAGING DATA
00132    44*         IAVE = 10
00132    45*   C
00132    46*   C     CARD 1 HAS NUMBER OF RUNS ON THE AVERAGING TAPE...COL. 1-4
00132    47*   C
00132    48*   C
00133    49*      12 READ (IIN,9030) NTRUNS
00136    50*         IF (NTRUNS) 14,14,20
00141    51*      14 WRITE (IOUT,9014)
00143    52*    9014 FORMAT (11H BAD CARD 1)
00144    53*         GO TO 24
00144    54*   C
00144    55*   C     INPUT AN ALPHAMERIC TITLE CARD WITH COL. 1-4 BLANK
00144    56*   C
00145    57*      20 READ (IIN,9020) JOUT
00150    58*    9020 FORMAT (A4,36H
00150    59*        1       40H                                          ,
00151    60*         IF (JOUT - JBLANK)22,30,22                          )
00154    61*      22 WRITE  (IOUT,9022)
00156    62*    9022 FORMAT (15H BAD TITLE CARD)
00157    63*      24 WRITE  (IOUT,9024)
00161    64*    9024 FORMAT ( 7H RESEND)
00162    65*      26 CALL EXIT
00162    66*   C
00162    67*   C     RUNS TO BE AVERAGED
00162    68*   C
00162    69*   C       FIRST CARD COL. 2-4    NUMBER OF RUNS IN AVERAGE
00162    70*   C                  COL. 7-15   RUN NUMBERS   MUST BE
00162    71*   C                  COL.17-25                 RIGHT-JUSTIFIED
00162    72*   C                  COL.27-35
00162    73*   C                  . . . . .
00162    74*   C                  COL.54-65                 UP TO 6 PER CARD
00162    75*   C
00162    76*   C       NEXT CARDS COL. 7-25
00162    77*   C
00162    78*   C                            ETC.
00163    79*      30 READ (IIN,9030) NRUNS,(KRA(I),KRB(I), I=1,NRUNS)
00173    80*    9030 FORMAT (I4,1X,6(1X,A4,A5)/(5X,6(1X,A4,A5)))
00174    81*         IF (NRUNS) 32,32,33
00177    82*      33 IF (NRUNS - NTRUNS) 34,34,32
00202    83*      32 WRITE (IOUT,9032)
00204    84*    9032 FORMAT (26H BAD CARD WITH RUN NUMBERS)
00205    85*         GO TO 24
00205    86*   C
00206    87*      34 DO 38 I=1,NRUNS
00211    88*         IF (KRB(I) - JBLANK) 32,32,38
00214    89*      38 CONTINUE
00214    90*   C
00216    91*    9001 FORMAT (1H1)
00217    92*    9990 FORMAT(1H )
00220    93*    9099 FORMAT (1H /1H )                                    07380
00220    94*   C
00220    95*   C     OUTPUT TITLE AT TOP OF EACH OUTPUT PAGE
00220    96*   C
00221    97*         WRITE (IOUT,9001)
00223    98*         WRITE (IOUT,9020) JOUT
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00226    99*          WRITE (IOUT,9039)
00230   100*     9039 FORMAT (// 35H RUNS TO BE INCLUDED IN THE AVERAGE/)
00231   101*      130 WRITE (IOUT,9030) NRUNS,(KRA(I),KRB(I), I=1,NRUNS)
00241   102*          WRITE (IOUT,9041)
00243   103*     9041 FORMAT (//23H TALLY    RUN NO. GEARS/)
00243   104*    C
00243   105*    C      ZERO STORAGES FOR CUMULATIONS
00243   106*    C
00244   107*       40 DO 42 I=1,769
00247   108*          JCT(I) = 0
00250   109*          DSQ(I) = 0.0
00251   110*          DO 42 J=1,9
00254   111*          G(I,J) = 0.0
00255   112*       42 S(I,J) = 0.0
00255   113*    C
00260   114*          DO 44 I=1,45
00263   115*          YSQ(I) = 0.0
00264   116*       44 Y(I) = 0.0
00264   117*    C
00264   118*    C      START AVERAGING LOOP
00264   119*    C
00266   120*      100 REWIND IAVE
00267   121*          NAVE = 0
00270   122*          ID = -1
00271   123*          DO 192 IRUN = 1,NTRUNS
00271   124*    C
00271   125*    C      READ ID = 1
00271   126*    C
00274   127*          READ (IAVE,9100) KA,KB,ID
00301   128*     9100 FORMAT (4X,11H                ,A4,A5,51X,I5)
00302   129*          IF (ID - 1)  102,104,102
00305   130*      102 WRITE (IOUT,9102) KA,KB,ID
00312   131*     9102 FORMAT (16H TAPE FLUB..RUN ,A4,A5,5X,5H ID = ,I5)
00313   132*          GO TO 24
00313   133*    C
00313   134*    C      SEARCH FOR RUN NO.    9-DIGIT ALPHAMERICAL
00313   135*    C
00314   136*      104 DO 106 I=1,NRUNS
00317   137*          IF (KB - KRB(I)) 106,105,106
00322   138*      105 IF (KA - KRA(I)) 106,108,106
00325   139*      106 CONTINUE
00325   140*    C
00325   141*    C      NO MATCH...SKIP RUN
00325   142*    C
00327   143*          DO 107 I=1,2000
00332   144*          READ (IAVE,9030) JSUB
00335   145*          IF (JSUB + 99) 107,192,107
00340   146*      107 CONTINUE
00342   147*          ID = 1070
00343   148*          GO TO 102
00343   149*    C
00343   150*    C      READ ID = 2
00343   151*    C
00344   152*      108 READ (IAVE,9107) (B(I),I=1,4),(N(I),I=1,3), B(5),N(4),ID
00361   153*     9107 FORMAT (4X,F12.7,3F11.7,I2,I4,I3,F6.0,I2,9X,I5)
00362   154*          IF (ID - 2)  102,110,102
00362   155*    C
00362   156*    C      READ ID = 3 TO 7
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00362   157*    C
00365   158*      110 JCARD = 3
00366   159*          DO 114  I=6,38,8
00371   160*          I2 = I + 7
00372   161*          READ (IAVE,9112) (B(J), J=I,I2),ID
00401   162*     9112 FORMAT (14X,8F6.2,13X,I5)
00402   163*          IF (ID - JCARD)  102,114,102
00405   164*      114 JCARD = JCARD + 1
00405   165*    C
00405   166*    C     B(1) TO B(45) LOADED      B(18)-(21) ARE ZERO
00405   167*    C     N(1) TO N(4)  LOADED
00405   168*    C
00405   169*    C     CUMULATE INTO Y(1) TO Y(41)
00405   170*    C
00407   171*          DO 122  I=1,45
00412   172*          IF (I - 18) 118,122,116
00415   173*      118 Y(I) = Y(I) + B(I)
00416   174*          YSQ(I) = YSQ(I) + B(I)**2
00417   175*          GO TO 122
00420   176*      116 IF (I - 21) 122,122,120
00423   177*      120 Y(I-4) = Y(I-4) + B(I)
00424   178*          YSQ(I-4) = YSQ(I-4) + B(I)**2
00425   179*      122 CONTINUE
00425   180*    C
00425   181*    C     CUMULATE INTO Y(42) TO Y(45)
00425   182*    C
00427   183*          DO 124  I=1,4
00432   184*          ZZ = N(I)
00433   185*      124 Y(I+41) = Y(I+41) + ZZ
00433   186*    C
00433   187*    C     SUBCATEGORY DATA
00433   188*    C
00435   189*      170 DO 178 I=8,2000
00440   190*          II = I + 1
00441   191*          READ (IAVE,9170) JSUB,(B(J), J=1,9),ID
00451   192*     9170 FORMAT (I4,3F5.0,3F5.1,  10X,F6.1,2F6.2,13X,I5)
00452   193*          IF (ID - I) 102,172,102
00455   194*      172 IF (JSUB) 180,102,176
00455   195*    C
00455   196*    C     JCT IS A TALLY FOR THE NUMBER OF RUNS WITH THAT SUBCATEGORY
00455   197*    C
00460   198*      176 JCT(JSUB) = JCT(JSUB) + 1
00461   199*          DSQ(JSUB) = DSQ(JSUB) + B(8)**2
00462   200*          DO 178 K=1,9
00465   201*      178 S(JSUB,K) = S(JSUB,K) + B(K)
00470   202*          ID = 9898
00471   203*          GO TO 102
00471   204*    C
00471   205*    C     GEAR DATA
00471   206*    C
00472   207*      180 NUMGR = N(4)
00473   208*          KGR =  9 - NUMGR
00474   209*          DO 188 I = II,2000
00477   210*          READ(IAVE,9180) JSUB,(B(J), J=1,9),ID
00507   211*     9180 FORMAT (I4,9F7.2,8X,I5)
00510   212*          IF (ID - I) 102,182,102
00513   213*      182 IF (JSUB) 190,102,186
00513   214*    C
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00513  215*   C      GEARS RENUMBERED WITH HIGHEST = 8
00513  216*   C
00516  217*     186 G(JSUB,1) = G(JSUB,1) + B(1)
00517  218*         DO 188 K = 1,NUMGR
00522  219*         KK = K + KGR
00523  220*     188 G(JSUB,KK) = G(JSUB,KK) + B(K+1)
00526  221*         ID = 9999
00527  222*         GO TO 102
00527  223*   C
00530  224*     190 NAVE = NAVE + 1
00531  225*         WRITE(IOUT,9190) NAVE,KA,KB,NUMGR
00537  226*    9190 FORMAT (I4,2X,A4,A5,I6)
00537  227*   C
00537  228*   C      EXIT OF DATA INPUT LOOP..NAVE = NUMBER OF RUNS AVERAGED
00537  229*   C
00540  230*         JJ = NRUNS - NAVE
00541  231*         IF (JJ) 194,194,192
00544  232*     192 CONTINUE
00544  233*   C
00546  234*         WRITE (IOUT,9193) NAVE,JJ
00552  235*    9193 FORMAT(/I6,40H RUNS AVAILABLE ON TAPE FOR AVERAGING...,I3,
00552  236*        1       13H RUNS MISSING)
00552  237*   C
00552  238*   C      AVERAGE DATA
00552  239*   C
00553  240*     194 REWIND IAVE
00554  241*         FNAVE = NAVE
00555  242*         R = 1.0/FNAVE
00556  243*         NDF = NAVE - 1
00557  244*         DF = NDF
00560  245*         RDF = 1.0/DF
00561  246*         T = TEE(NDF)/SQRT (FNAVE)
00561  247*   C
00562  248*     220 DO 228 I=1,769
00565  249*         IF (JCT(I)) 228,228,221
00570  250*     221 Q = JCT(I)
00571  251*         Q = 1.0/Q
00572  252*         DO 224 J=1,7
00575  253*         S(I,J) = Q*S(I,J)
00576  254*     224 G(I,J) = Q*G(I,J)
00576  255*   C
00576  256*   C
00600  257*         G(I,8) = Q*G(I,8)
00601  258*         G(I,9) = Q*G(I,9)
00602  259*         S(I,9) = R*S(I,9)
00603  260*         AVE = R*S(I,8)
00604  261*         SSQ = DSQ(I) - AVE*S(I,8)
00605  262*         IF (SSQ - 0.0001) 225,226,226
00610  263*     225 DSQ(I) = 0.0
00611  264*         GO TO 227
00612  265*     226 DSQ (I) = SQRT (SSQ*RDF)
00613  266*     227 S(I,8) = AVE
00614  267*     228 CONTINUE
00614  268*   C
00616  269*         DO 240 I=1,45
00621  270*         AVE = R*Y(I)
00622  271*         SSQ = YSQ(I) - AVE*Y(I)
00623  272*         IF (SSQ - 0.0001) 232,233,233
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00626  273*      232 YSQ(I) = 0.0
00627  274*          GO TO 234
00630  275*      233 YSQ(I) = SQRT (SSQ*RDF)
00631  276*      234 CONF = T*YSQ(I)
00632  277*          A(I) = AVE - CONF
00633  278*          IF (ABS(A(I)) - 0.0001) 236,238,238
00636  279*      236 A(I) = 0.0
00637  280*      238 B(I) = AVE + CONF
00640  281*      240 Y(I) = AVE
00640  282*    C
00640  283*    C     AVE NOW STORED IN Y(I)   AND S(I,8)
00640  284*    C     SD  NOW STORED IN YSQ(I) AND DSQ(I)
00640  285*    C        CONFIDENCE LIMITS OF THE Y IN A(I) AND B(I)
00640  286*    C
00640  287*    C     ROUND FOR CERTAIN I-FORMAT OUTPUTS
00640  288*    C
00642  289*          MPJVAC = Y(42) + 0.5
00643  290*          ID     = Y(43) + 0.5
00644  291*          IV     = Y(44) + 0.5
00645  292*          IA     = Y(5) + 0.5
00645  293*    C
00645  294*    C
00645  295*    C     OUTPUT IN FORMAT SIMILAR TO MODES. (MAR. 67)
00645  296*    C
00645  297*    C
00645  298*    C     PREFILLS FOR OUTPUT OF SUBCATEGORY TITLES
00645  299*    C
00645  300*    C                              IDLE
00646  301*     1001 K769(1) = 17755
00646  302*    C                              CRUISE
00647  303*          II = 2
00650  304*          DO 1002 K=1,6
00653  305*          JJ = 20000 + 1100*K
00654  306*          DO 1002 I=1,4
00657  307*          DO 1002 M=1,4
00662  308*          K769(II) = JJ + 10*I + M
00663  309*     1002 II = II + 1
00663  310*    C                              ACCELERATION
00667  311*          DO 1003 J=1,6
00672  312*          DO 1003 K=J,6
00675  313*          JJ = 30000 + 1000*J + 100*K
00676  314*          DO 1003 I=1,4
00701  315*          DO 1003 M=1,4
00704  316*          K769(II) = JJ + 10*I + M
00705  317*     1003 II = II + 1
00705  318*    C                              DECELERATION
00712  319*          DO 1004 J=1,6
00715  320*          DO 1004 K=1,J
00720  321*          JJ = 40000 + 1000*J + 100*K
00721  322*          DO 1004 I=1,4
00724  323*          DO 1004 M=1,4
00727  324*          K769(II) = JJ + 10*I + M
00730  325*     1004 II = II + 1
00730  326*    C
00730  327*    C                                                    06510
00730  328*    C     SUMMARY PAGE
00730  329*    C
00730  330*    C
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00735   331*      300 WRITE (IOUT,9001)
00737   332*          JOUT = JBLANK
00740   333*          WRITE (IOUT,9020) JOUT
00743   334*          WRITE (IOUT,9301) NRUNS,NAVE
00747   335*     9301 FORMAT(//14H RUNS AVERAGED/15H   INPUT  VALUE,I13/
00747   336*    1        15H   ACTUAL VALUE,I13/)
00747   337*     C
00750   338*       305 WRITE (IOUT,9305) ID
00753   339*      9305 FORMAT (16H IDLE SPEED, RPM,I12)
00754   340*       306 WRITE (IOUT,9306) IV
00757   341*      9306 FORMAT (17H IDLE VACUUM, IN.,I11)
00760   342*       307 WRITE (IOUT,9307) MPJVAC
00763   343*      9307 FORMAT (22H POWER JET VACUUM, IN.,I6)
00764   344*       308 WRITE (IOUT,9308) IA
00767   345*      9308 FORMAT (12H AVERAGE RPM,  I16/)
00767   346*     C
00770   347*          WRITE (IOUT,9320)
00772   348*      9320 FORMAT (23H POWER MODE PERCENTAGES/)
00773   349*          WRITE (IOUT,9322)  (N1(I),N2(I), I=1,3)
01002   350*      9322 FORMAT (6X,     3(6H  ....,A6,A5,10H BASIS....,4X)/)
01003   351*          WRITE (IOUT,9324)
01005   352*      9324 FORMAT (6X,      3(27H  AVE.   SD    CONF. LIMITS,4X)/)
01005   353*     C
01006   354*          DO 311 I=1,4
01011   355*       311 WRITE (IOUT,9311) NAPOW(I),Y(I+5),YSQ(I+5),A(I+5),B(I+5),
01011   356*      1         Y(I+9),YSQ(I+9),A(I+9),B(I+9),
01011   357*      2         Y(I+13),YSQ(I+13),A(I+13),B(I+13)
01031   358*      9311 FORMAT (2X,A2,2X,3(F6.1,F6.2,F7.1,2H -,F5.1,5X))
01031   359*     C
01031   360*     C      OUTPUT PERCENTAGE CHANGE TABLE                                  07300
01031   361*     C                                                                      07310
01032   362*      1642 WRITE (IOUT,9645)                                                07320
01034   363*      9645 FORMAT(  //40H PERCENTAGE CATEGORY-TO-CATEGORY CHANGES/)
01035   364*          WRITE (IOUT,9650) (NACAT(K), K=1,4)
01043   365*      9650 FORMAT (6H FROM ,4(12H  .......TO ,A3,5H MODE,7(1H.),4X)/)
01044   366*          WRITE (IOUT,9651)
01046   367*      9651 FORMAT (6H MODE ,4(27H  AVE.   SD    CONF. LIMITS,4X)/)
01047   368*          DO 1660 J=1,4
01052   369*          K = 4*J - 3
01053   370*       1660 WRITE (IOUT,9660) NACAT(J),Y(K+25),YSQ(K+25),A(K+25),B(K+25),
01053   371*      1                                Y(K+26),YSQ(K+26),A(K+26),B(K+26),
01053   372*      2                                Y(K+27),YSQ(K+27),A(K+27),B(K+27),
01053   373*      3                                Y(K+28),YSQ(K+28),A(K+28),B(K+28)
01077   374*      9660 FORMAT (2X,A3,1X,4(2F6.2,F7.2,2H -,F6.2,4X))
01077   375*     C
01077   376*     C      OUTPUT TABLE FOR MAJ. CAT. CUMULATIONS                          07160
01077   377*     C                                                                      07170
01100   378*          WRITE (IOUT,9638)
01102   379*      9638 FORMAT(//27H MAJOR CATEGORY PERCENTAGES/)
01103   380*          WRITE (IOUT,9639)  (N1(I),N2(I), I=2,3)
01112   381*      9639 FORMAT (6X,     2(6H  ....,A6,A5,10H BASIS....,4X)/)
01113   382*          WRITE (IOUT,9640)
01115   383*      9640 FORMAT (6X,      2(27H  AVE.   SD    CONF. LIMITS,4X)/)
01115   384*     C
01116   385*          DO 1641 K=1,4                                                   07220
01121   386*       1641 WRITE (IOUT,9641) NACAT(K),Y(K+17),YSQ(K+17),A(K+17),B(K+17),
01121   387*      1                                Y(K+21),YSQ(K+21),A(K+21),B(K+21)
01135   388*      9641 FORMAT (2X,A3,1X,2(2F6.2,F7.2,2H -,F6.2,4X))
```

```
01135   389*   C
01136   390*         WRITE (IOUT,9658)                                          1  07510
01140   391*    9658 FORMAT (//12H 95 PER CENT,
01140   392*        1          49H TWO-SIDED CONFIDENCE LIMITS ARE SHOWN THROUGHOUT)
01140   393*   C
01140   394*   C
01140   395*   C     OUTPUT ZERO-TORQUE DATA
01140   396*   C
01141   397*    2100 WRITE (IOUT,9001)
01143   398*         WRITE (IOUT,9020) JOUT
01146   399*         WRITE (IOUT,9099)
01150   400*         WRITE (IOUT,9108)
01152   401*    9108 FORMAT(33H ZERO-TORQUE MANIFOLD VACUUM DATA/)
01153   402*     109 WRITE (IOUT,9109)ZTA,ZTB,ZTC,ZTD
01161   403*    9109 FORMAT (5X,3HA =,1PE15.7/5X,3HB =,1PE15.7/5X,3HC =,1PE15.7/
01161   404*       1        5X,3HD =,1PE15.7//)
01162   405*         WRITE (IOUT,9110)
01164   406*    9110 FORMAT (6X,3HRPM,4X,6HIN. HG/)
01164   407*   C
01165   408*    2112 DO 2130 I=1,21
01170   409*         JJ = 200*I - 200
01171   410*         FI = I
01172   411*         X = 0.5*(FI - 11.0)
01173   412*         ZT = ZTA + X*(ZTB + X*(ZTC + ZTD*X))
01174   413*    2130 WRITE (IOUT,9130) JJ,ZT
01201   414*    9130 FORMAT (I9,F9.1)
01201   415*   C
01202   416*         WRITE (IOUT,9099)
01204   417*         WRITE (IOUT,9150) Y(42)
01207   418*    9150 FORMAT (19H POWER JET VACUUM =,F5.1,7H IN. HG)
01207   419*   C
01207   420*   C                                                               1  08140
01207   421*   C     OUTPUT SUBCATEGORY TABLE                                     08150
01207   422*   C
01207   423*   C                                                                  08170
01210   424*    1700 KTAB = 0
01211   425*         LLINES = 40
01212   426*    1710 JSUB = 1
01213   427*    1711 IF (JCT(JSUB)) 1724,1724,8712
01213   428*   C
01216   429*    8712 IF (LLINES - 36) 1712,8714,8714
01221   430*    8714 LLINES = 0
01222   431*         L3 = 0
01223   432*         WRITE (IOUT,9001)
01225   433*         WRITE (IOUT,9020) JOUT
01230   434*         WRITE (IOUT,9990)
01232   435*         WRITE (IOUT,9700)
01234   436*    9700 FORMAT(/44H  NO. MAJ ..SPEED.. .POWER.  ...SPEED RPM...,
01234   437*       1        20H  .IN.  HG VACUUM   ,5HAV DU,
01234   438*       2    39HR  PCT REV    ...PERCENTAGE DURATION...)
01235   439*         WRITE (IOUT,9702)
01237   440*    9702 FORMAT (6X,38HCAT FROM  TO  FROM TO  INIT  AVE FINAL,
01237   441*       1        17H  INIT  AVE FINAL, 4X, 4HTIME,
01237   442*       2     39H      AVE.     AVE.   SD    CONF. LIMITS/)
01237   443*   C
01240   444*    1712 LLINES = LLINES + 1                                       08160
01241   445*         IF (L3 - 3) 8720,8718,8718
01244   446*    8718 WRITE (IOUT,9990)
```

```
01246   447*          L3 = 0
01247   448*     8720 L3 = L3 + 1
01250   449*          JJJ = K769(JSUB)
01251   450*          J1 = JJJ/10000
01252   451*          JJJ = JJJ - 10000*J1
01253   452*          J2  = JJJ/1000
01254   453*          JJJ = JJJ -  1000*J2
01255   454*          J3  = JJJ/100
01256   455*          JJJ = JJJ  -  100*J3
01257   456*          J4  = JJJ/10
01260   457*          J5  = JJJ  -   10*J4
01261   458*          IF (KTAB) 1814,1713,1814
01264   459*     1713 CONF = T*DSQ(JSUB)
01265   460*          C1 = S(JSUB,8) - CONF
01266   461*          IF (ABS(C1) - 0.0001) 1718,1719,1719
01271   462*     1718 C1   = 0.0
01272   463*     1719 C2 = S(JSUB,8) + CONF
01273   464*          K4 = 1
01274   465*          IF (C1) 1722,1720,1720
01277   466*     1720 K4 = 2
01300   467*     1722 K1 = S(JSUB,1) + 0.5
01301   468*          K2 = S(JSUB,2) + 0.5
01302   469*          K3 = S(JSUB,3) + 0.5
01303   470*     1714 WRITE (IOUT,9722)JSUB,NACAT(J1),NASP(J2),NASP(J3),NAPOW(J4),
01303   471*         1       NAPOW(J5),K1,K2,K3,
01303   472*         1                 (S(JSUB,K), K=4,7),S(JSUB,9),
01303   473*         2       S(JSUB,8),DSQ(JSUB),C1,C2,N3(K4)
01330   474*     9722 FORMAT (1X,I4,1X,A3,2(1X,A4),2(2X,A2),1X,3I5,F7.1,2F5.1,1X,
01330   475*         1       F8.2,2F9.2,F6.2,F7.2,2H -,F6.2,1X,A2)
01330   476*    C
01331   477*     1724 IF (JSUB - 769) 1798,1799,1799
01334   478*     1798 JSUB = JSUB + 1
01335   479*          GO TO 1711
01335   480*    C
01336   481*     1799 WRITE (IOUT,9990)                                        08260
01336   482*    C
01336   483*    C
01336   484*    C     OUTPUT SUBCATEGORY TABLE WITH GEAR DATA
01336   485*    C
01336   486*    C
01340   487*     1800 KTAB = 1
01341   488*          LLINES = 40
01342   489*          JSUB = 1
01343   490*     1801 IF (JCT(JSUB)) 1826,1826,8722
01343   491*    C
01346   492*     8722 IF (LLINES - 36) 1712,8724,8724
01351   493*     8724 LLINES = 0
01352   494*          L3 = 0
01353   495*          WRITE (IOUT,9001)
01355   496*          WRITE (IOUT,9020) JOUT
01360   497*          WRITE (IOUT,9799)
01362   498*     9799 FORMAT(/60X,29HGEARS RENUMBERED..HIGHEST = 8)
01363   499*          WRITE (IOUT,9800)
01365   500*     9800 FORMAT(/41H  NO. MAJ ..SPEED.. .POWER.    PCT      .,
01365   501*         1      9(1H.),44HPERCENTAGE OF SUBCATEGORY TIME IN GEAR SHOWN,
01365   502*         2       11(1H.))
01366   503*          WRITE (IOUT,9802) (I, I=1,8)
01374   504*     9802 FORMAT (6X,35HCAT FROM  TO  FROM TO   DURAT     N,8I8/)
```

```
01375   505*          GO TO 1712
01375   506*    C
01376   507*     1814 WRITE (IOUT,9822)JSUB,NACAT(J1),NASP(J2),NASP(J3),NAPOW(J4),
01376   508*         1           NAPOW(J5),S(JSUB,8),(G(JSUB,I), I=1,9)
01413   509*     9822 FORMAT (1X,I4,1X,A3,2(1X,A4),2(2X,A2),10F8.2)
01413   510*    C                                                              08570
01414   511*     1826 IF (JSUB - 769) 1817,1818,1818
01414   512*    C
01417   513*     1817 JSUB = JSUB + 1
01420   514*          GO TO 1801
01420   515*    C
01421   516*     1818 WRITE (IOUT,9818) NAVE
01424   517*     9818 FORMAT (////26H AVERAGING OF THIS SET OF ,I4,15H RUNS COMPLETED)
01425   518*          WRITE (IOUT,9001)
01427   519*          GO TO 12
01427   520*    C
01430   521*          END
```

END OF LISTING. 0 *DIAGNOSTIC* MESSAGE(S).

12:35:52 @ XQT MODAVE

STARTING ADDRESS
014000

CORE USAGE
014000-022276 100000-143135

DRUM USAGE
NONE

BLANK COMMON
NONE

MODAVE/CODE		NRWND$/CODE		NTAB$ /ND		NIO$ /ND		SQRT /CODE		NEXIT$/ND	
1	014000-016425	1	016426-016466	2	142321-142400	0	142401-143031	1	021676-021740	0	143040-143135
2	100000-142320					1	016467-021675	2	143032-143037	1	021741-022276

12:35:56 END OF ALLOCATION